

In This Issue—*The Detroit Conventions*

# MOTOR AGE

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Number 22

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CHICAGO, MAY 29, 1924

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Three Dollars a Year

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President  
Jordan Motor Car Company  
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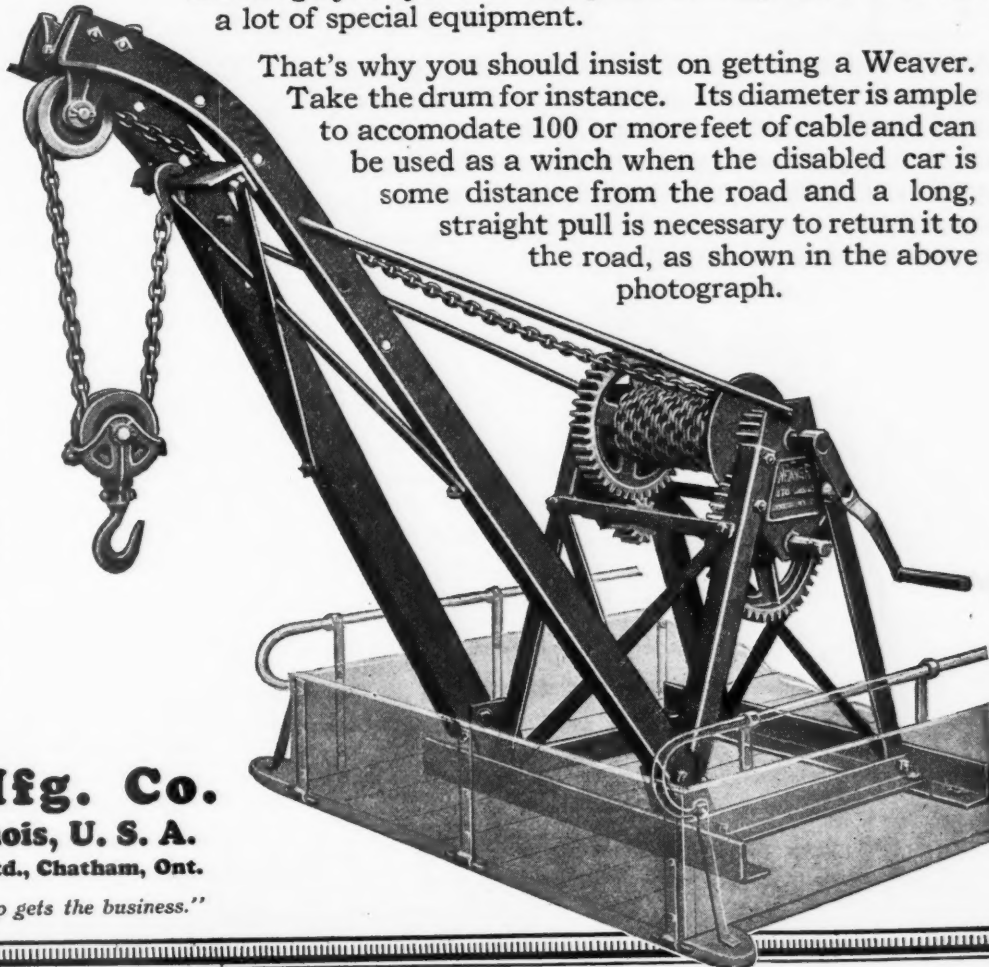
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## Oil-Regulating Piston Rings

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**C**AREFULLY made tests conducted by America's leading automotive engineers have proved that there is no more leakage through a diagonal joint than there is through a step-cut joint.

They attach so little importance to the joint that on many factory specifications, the type of joint is optional with the ring maker.

Engineers *do* agree, however, that **ROUNDNESS** (uniform radial pressure), **FLATNESS**, (freedom from edge-warp), **RESILIENT MATERIAL**, and **ACCURATE WORKMANSHIP**, are vital!

These essential qualities you get in **PERFECT CIRCLES**, *plus* the exclusive *oil-regulating* principle which makes possible an oil-mileage of at least 1000 miles to the gallon, and at the same time lubricates the cylinder walls, thoroughly.

They are used as standard equipment by 48 leading manufacturers. Try one set and you will understand why.

# MOTOR AGE

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## What About The Second Crop?

A veteran automobile dealer once said: "Selling cars reminds me of farming. If the soil is exhausted by one crop and needs constant fertilizing and coaxing to produce a good second crop, then there won't be much profit.

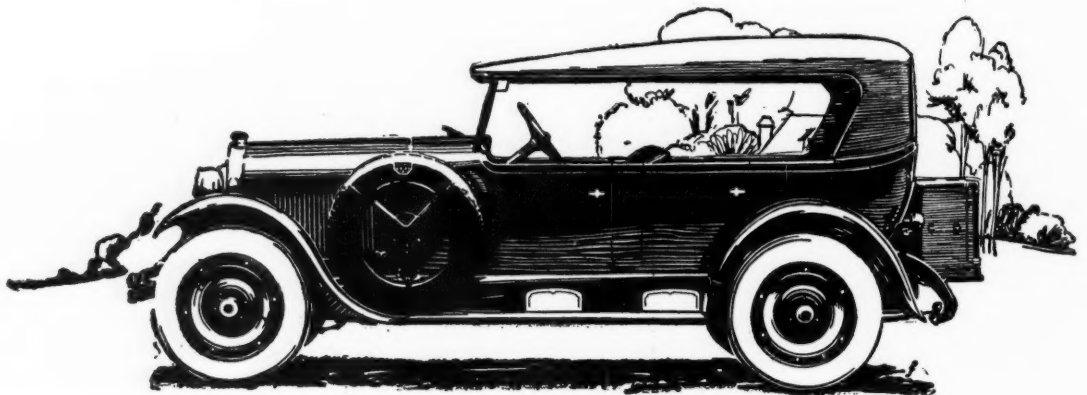
"If an automobile dealer must look constantly for new prospects because he is unable to sell the same make of car to an owner the second and third time, then he will soon exhaust the possibilities of his territory."

Westcott dealers have no such worries.

Westcott owners know that 100,000 miles is not too much to ask of the Westcott car. Consequently, the average Westcott owner will consider no other car when he is ready to make another purchase.

The second crop comes automatically to the Westcott dealer. This is a mighty important phase of the Westcott franchise and calls for serious consideration.

*J. Westcott*  
President.



THE WESTCOTT MOTOR CAR COMPANY • SPRINGFIELD, OHIO

# The Turning Point

A word to the dealer, standing at the fork of the road, puzzled over which route to take

**T**HE turning point to success for many automobile dealers is the day they realize the folly of trying *to fit the public with their car* instead of *fitting the car to the buyer*.

You can't fit the buyer with the size of the car he demands, the style of body preferred, any more than you can fit his pocket-book unless you handle a line of cars that is sufficiently varied and complete to allow him to make a choice.

After the Studebaker dealer convinces the prospect that he should own a Studebaker—an easy thing to do—then it is a simple matter for him to select exactly the type of car he has in mind.

Many dealers today are standing at the Fork of the Road. One way goes direct to the whole quality field. The other is a narrow, winding path that leads only to a very limited market.

Which road to follow? The success enjoyed by Studebaker dealers is the answer!

LIGHT-SIX	SPECIAL-SIX	BIG-SIX
5-Pass. 112-in. W. B. 40 H. P.	5-Pass. 119-in. W. B. 60 H. P.	7-Pass. 126-in. W. B. 80 H. P.
Touring . . . . . \$1045	Touring . . . . . \$1425	Touring . . . . . \$1750
Roadster (3-Pass.) . . . . 1025	Roadster (2-Pass.) . . . . 1400	Speedster (5-Pass.) . . . . 1835
Coupe-Roadster (2-Pass.) . . 1195	Coupe (5-Pass.) . . . . 1895	Coupe (5-Pass.) . . . . 2495
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Sedan . . . . . 1485		

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THE STUDEBAKER CORPORATION OF AMERICA  
South Bend, Indiana



# Here's a Car you can sell to your Best Friend

As a dealer, you are proud of the confidence which customers place in your judgment. You would not knowingly sell your best friend a car that was not up-to-the-minute any more than you would recommend a doubtful stock investment to him.

By the same reasoning, Oakland dealers sell with confidence because they are selling a car with the latest and best features. For example, four-wheel brakes, a proved essential of a thoroughly modern automobile, are standard equipment on the True Blue Oakland at no added cost.

Oakland also is the only light-six with permanent top, special Duco finish, centralized controls, glass enclosures and other features, many exclusive, which you can personally recommend to your trade.

If ever there was a car which you can conscientiously sell to your best friend, it is this True Blue Oakland Six.

OAKLAND MOTOR CAR CO., PONTIAC, MICH.

Roadster . . . \$ 995  
Touring Car . . . 995  
Sport Touring . . . 1095  
Sport Roadster . . . 1095  
Business Coupe . . . 1195



Coupe for Four \$ 1395  
Sedan . . . 1445

Glass Enclosures for Touring  
Cars \$60—for Roadsters \$40.  
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Oakland Glass Enclosures for  
Touring Cars \$60, Roadsters \$40.





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## USL Shows YOU How to Make More Money

**W**HEN you hang out the official USL service sign you attract the business of a large number of motorists in your town, who are driving USL equipped cars. You step right into a ready made battery business.

You also get the benefit of a *brand new, complete and definite Merchandising Plan* which is bound to increase your battery sales and profits.

A plan that YOU can use every day in the week, every week in the year.

A plan based on the methods and

ideas which thousands of successful battery distributors have used and found profitable. It gives you just the kind of assistance you need in solving every problem you meet in *your* business.

Backed by the great USL organization you will build *your business* on a solid rock foundation.

Write TODAY for full particulars of the new USL Merchandising Plan and information that will show you how *you* can build a 100% Service Station—in quality of service, reputation, sales and profits.

**U. S. Light & Heat Corporation, Niagara Falls, N. Y.**

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in the direction of  
**GENUINE BALLOON TIRES**  
makes the REO franchise  
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because REO cars are  
ideally suited to  
**BALLOON TIRE**  
equipment

The Reo line today embraces a product to fit every phase of motor transport—Passenger Cars—Speed Wagons—Taxicabs—Passenger Busses—Speed Wagon Parcel Delivery.

**Reo Motor Car Company • • Lansing, Michigan**





## "Cars Enhance—World's Advance"

America's Leadership in Automotive Trade Recognized by Delegates from Many Nations Assembled at Detroit

By  
SAM  
SHELTON

Maintenance Equipment Show and Service Convention Draw Hundreds of Dealers to Eventful Week of Trade Activities

**W**ORLD wide recognition of American leadership in the Automotive industry was registered at Detroit last week when delegates from many nations joined with dealers and manufacturers from all parts of the United States and Canada in series of eventful meetings.

Paying tribute to the vastness of America's motor transportation business were men from Great Britain, Germany, South Africa, Egypt, France, Belgium, Argentina, Australia, China, Cuba, New Zealand, Columbia, Austria, Italy, Japan, Poland, Mexico, Brazil, Denmark, Peru and several other nations.

At the same time hundreds of men engaged in the automotive trade in the United States gathered to pay tribute to a particular branch of the business which is growing into astounding volume—that of maintenance.

It was the first time such gatherings have been held in America and distinctly marked the development of a new era in both domestic and foreign automotive trade. The public gatherings held during the week were:

World Motor Transport Congress.

*THE slogan of the first World Motor Congress held in Detroit last week at the time of National Automotive Service Convention and Automotive Maintenance Equipment Show was "Cars Enhance—World's Advance."*

*This motto was stamped on the bronze pendant of the badges issued to delegates. The pendant showed the earth globe in semi-relief with a band around the center upon which was stamped reproductions of the various types of useful motor vehicles.*

National Automotive Service Convention.

Automotive Maintenance Equipment Show.

N. A. D. A. Secretaries' Conference.

S. A. E. Service Meeting.

In addition to these there was a meeting of the board of directors of the Automotive Equipment Association, a meeting of the Automotive Electric Association, a meeting of the balloon tire committee of the N. A. C. C., and other gath-



erings of groups representing distinct divisions of the industry.

With these gatherings running concurrently and over-lapping Detroit was truly the motor capital of the world and the lobbies of the hotels presented probably the most cosmopolitan appearance in the city's history.

Impressive and prophetic for the good of the industry was the complete co-operation evidenced by the various organized groups representing distinct branches of the business. The National Automobile Chamber of Commerce, which is the car and truck manufacturers' organization, took the lead in staging the interesting program of the week, but it had both the formal indorsement and active help of other trade bodies.

In the service convention and equipment show the participating trade associations, in addition to the N. A. C. C., were: Society of Automotive Engineers; Motor and Accessory Manufacturers' Association, which comprises large producers of parts and equipment used in the manufacture and assembly of cars and trucks; National Automobile Dealers' Association, the trade organization of the retail dealers; Automotive Equipment Association, the national organization of the manufacturers and jobbers of accessories, equipment and supplies; Service Equipment Associates, an organization of the manufacturers of shop equipment.

The World Motor Transport Congress, staged by the N. A. C. C., attracted the interest of the other groups meeting in Detroit and the daily sessions at Hotel Statler were crowded with dealers, manufacturers, service men, association secretaries and others eager to listen not only to the heads of great American motor car factories, but also to the representatives of foreign nations, some of whom told of the difficulties of automotive progress in their native lands.

Among the American manufacturers who either delivered addresses at this convention or prepared addresses which were read were Alvan Macauley, president of Packard Motor Car Co.; T. R. Dahl, vice-president of the White Motor

## BIG NEWS

In the Automotive Industry  
*THE automotive industry moves faster and provides more news of interest to the trade and the public than any other private business in the world. Practically 100 per cent of the country's population of school age and upward is interested in automotive developments and a large proportion of this population depends upon motor car dealers and salesmen for its automobile news.*

*Some of the biggest news events in the history of the industry took place in Detroit last week. The full story of these events is told in this issue of MOTOR AGE, and those persons who read about them will be well informed of the latest movements for the progress of the trade.*

There is big news of the automotive industry in MOTOR AGE  
**EVERY WEEK**

Co.; Myron E. Forbes, president of Pierce-Arrow Motor Car Co.; John Hertz, president of Yellow Cab Manufacturing Co.; Edward S. Jordan, president of Jordan Motor Car Co.; J. F. Haynes, president of Dodge Brothers; Carl H. Page, director of sales, Durant Motors of New Jersey; A. R. Erskine, president of the Studebaker Corporation; C. C. Cooper, president of General Motors Acceptance Corporation; A. J. Brosseau, president of Mack Trucks, Inc.; Roy D. Chapin, chairman of the board of Hudson Motor Car Co., and H. H. Rice, president of Cadillac Motor Car Co.

### Many Foreign Speakers Attend

Among other speakers were Sir Henry Worth Thornton, president of Canadian National Railways; Keith Duncan, of the Chamber of Motor Industries of South Australia; H. Weinberger, of the Association of the Austrian Automobile Industry, Vienna; Abbas Wahby Bey, representative of Wahby Freres, Alexandria, Egypt; William G. Eiben, vice-president of Comfort Printing and Specialty Co.; Warren K. Lee, of the North East Electric Co.; Lawrence B. Ross, of the Havana

Chamber of Commerce, Cuba; A. S. Burgess of A. Hatrick & Co., New Zealand; Thomas H. MacDonald, chief of the United States Bureau of Public Roads; J. Walter Drake, assistant secretary of commerce; Ludwig Buchkremer, president of Automobile Dealers' Association of Germany; C. G. Saker, of the South African Motor Traders' Association; Thomas P. Henry, president of the American Automobile Association; John A. Butler, president of National Automobile Dealers' Association, and Alfred Reeves, general manager of the National Automobile Chamber of Commerce.

The few motor vehicles in use in foreign countries as compared with America lends significance to this world congress, because of the trade possibilities that are opened up for the American automotive industry to promote and develop the business of motor transport beyond our own confines. And the automotive progress of the other nations is certain to be reflected throughout the trade in the United States and perhaps have a great influence on the kind of automobiles that we will use and sell in the future.

The fact that out of 18,000,000 motor vehicles in use throughout the world, more than 15,000,000 are in the United States, immediately brands the nations across the seas as lagging far behind in modern transportation. But the fact that 125 intensely interested delegates from so many countries came to Detroit to learn about America's automotive transportation system reveals a determination on their part to work for the greater development of motor vehicles in their respective countries.

To the European and Asiatic the automobile is a luxury; to the American it is a practical utility—this was the outstanding thought revealed by an analysis of the speeches made by Americans and visitors from other lands. Being considered a luxury in the foreign nations, the automobile is taxed beyond the means of any but the wealthy. In some countries excellent railway systems have retarded the introduction of motor vehicles. In others lack of roads has made the use



At the left is a view of the Automotive Electric Service Assn. using acar chassis to show the electric equipment. At the right is a view of one aisle

of automobiles almost impossible except in the narrow confines of cities.

#### Show Hailed as Success

Foreign speakers, however, told of growth of public interest in motor vehicles and predicted a great era of automotive development—and the American industry, already in the position of leadership, is looked upon as the chief source of supply.

The service convention and the equipment show, innovations in the organized activities of the automotive trade, were hailed as decidedly successful and useful enterprises by manufacturers, dealers and service men. It has been the custom of the N. A. C. C. for a number of years to hold regular service conventions, but these have been only for the service departments of the factories. This year the convention for the first time was made a public affair, open to all the trade and factory men and dealers met on equal grounds.

The holding of the equipment show concurrently was declared to be a most happy arrangement by all interests. The show was in the exposition hall of General Motors Building and the service convention was held in an assembly hall on another floor of the same building. The show was open mornings and until 2 p. m. from Monday until Friday and from 2 to 5 p. m. was closed during the sessions of the service convention. It was also open in the evenings until 10 o'clock. The show, like the convention, was open free

to the trade, the only credentials for admittance being some evidence of connection with the automotive business.

Attendance at both the convention and the show ran far beyond the expectations of the management, and thereby Mr. Alfred Reeves was put to the expense of buying a good dinner for some of his associates who had been bold enough to venture a more optimistic opinion of the outlook than he entertained. The show was especially attractive because of the large number of tools and machines that were demonstrated in operation. Cylinder grinders, boring machines, hones and drills were exhibited at their tasks. Air compressors pumped air and bearing machines were operated as in the shop.

The fact that maintenance equipment of the high-grade exhibited was segregated and made available for inspection under one roof was welcomed by men engaged in the maintenance business and by factory service men who naturally are becoming more and more interested in the proper and economical servicing of the products of the manufacturer.

#### Sam A. Miles Is Chief

The show was staged under the management of Sam A. Miles and his staff of assistants who for years have had charge of the national automobile shows at Chicago and New York.

The service convention presented a full program of helpful addresses on topics directly related to automotive maintenance.

It was presided over by Frank A. Bonham, chairman of the service committee of the N. A. C. C. Assisting Mr. Bonham in arranging and presenting this program was a committee composed of Coker F. Clarkson, general manager of the S. A. E., and C. A. Vane, general manager of the N. A. D. A., in addition to the following members of the N. A. C. C. service committee: A. B. Cumner, Autocar; L. C. Voyles, Marmon; W. M. Warner, Cadillac; F. J. Wells, Pierce-Arrow, and H. R. Cobleigh, secretary.

The show committee in addition to Manager Miles was composed of M. L. Heminway, general manager of the Motor and Accessory Manufacturers' Association; W. M. Webster, commissioner of the A. E. A., and S. Duncan Black of the Service Equipment Associates.

Detailed accounts of the service convention and equipment show are published elsewhere in this issue of *MOTOR AGE*.

The week in Detroit gave many of the American and foreign delegates their first opportunity to visit the large motor vehicle factories. Special tours were arranged for those desiring to visit factories and all the plants in the Detroit area were made available for inspection by visitors.

The opinion was expressed by many visitors and delegates that the week's program was the most successful affair ever undertaken by the automotive industry and that it should be repeated next year.

## Service Convention Brings Together All Classes of Men in Industry

BY B. M. IKERT

THE significant thing about the National Automotive Service Convention which was held last week in connection with the Automotive Maintenance Equipment Show was that for the first time there were assembled into one group engineers, sales managers, dealers, service managers, mechanics, repairmen and garage operators for the purpose of hearing their common problems discussed.

The excellent attendance at the four meetings was indicative that the future holds much promise of what will be accomplished insofar as getting those men most vitally interested in the service problem together. It is certain that more of these meetings will be staged and while some criticism might be directed at some of the subjects discussed, it is equally certain that subsequent meetings will bring with them papers and discussion on pertinent subjects and of interest to all.

#### Bonham Opens Convention

Frank A. Bonham, chairman, opened the convention on Monday afternoon with a brief statement of the purposes of the convention and a plan of the convention and equipment show. He introduced Alfred Reeves, general manager of the

National Automobile Chamber of Commerce, who in a short, breezy talk told of the coming importance of service and service equipment. Sam A. Miles, show



C. A. Vane

manager, was highly complimented upon the arrangement for the show.

C. A. Vane, the first speaker on the program, could not be present, but his address, "What the Public Is Entitled to Receive from the Service Man," was ably presented by Lynn M. Shaw. He told of the difficulty the public had had in securing good automobile service and commented upon a number of bills which had been introduced in various legislatures for the purpose of licensing mechanics, licensing repair shops and in other ways seeking to bring automobile repairing under the control of the law. Mr. Shaw said that probably the owner had been benefited to a greater extent by the flat rate system than by any other one thing that had ever been done in the service end of the industry.

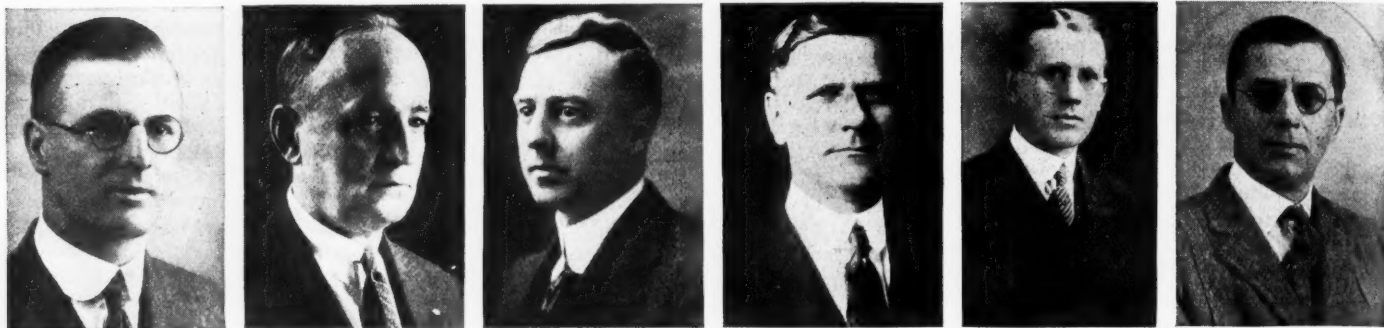
The subject of the guarantee or standard warranty was brought up and attention called to the fact that factory, salesman, service manager and car owner all had different views of just what the guarantee meant.

#### On Used Cars

Speaking of the used car, Mr. Shaw said that too many dealers were losing sight of the fact that selling price meant cost plus overhead plus profit and that



## Service Committee of the National Automobile Chamber of Commerce



Left to right: Frank A. Bonham, chairman, Durant Motors; A. B. Cumner, Autocar; W. M. Warner, Cadillac; L. C. Voyles, Marmon; F. J. Wells, Pierce-Arrow; H. R. Cobleigh, secretary

when they neglected to take all of these items into consideration, they found themselves close to failure.

J. C. Wright, director of the Federal Board for Vocational Education, in his paper on the selection and training of automotive repairmen, reviewed the relations between the repairmen and the public and told of the various means in present use of educating automobile repairmen. Mr. Wright made the statement that a great deal of the mechanical labor in automobile shops today originally came from the farm and to prove his point asked those in the audience who had come from the farm to raise their hands. A very considerable majority admitted their farm origin.

Going into the subject of the qualifications for an automobile mechanic, Mr. Wright laid down four fundamentals:

- 1—The possession of a job conscience or of a job pride.
- 2—The possession of necessary physical qualifications.
- 3—The possession of necessary mental qualifications.
- 4—The possession of a considerable degree of ingenuity and resourcefulness.

The last speaker of the first day's session was E. M. Young, Advisory Staff, General Motors Corp., and he took as his subject "Shop Layout and General Equipment." This talk was illustrated with a number of lantern slides showing ideal layouts for varying conditions. Mr. Young brought out the necessity for varying the arrangement dependent upon the plot of ground being on a corner or in the center of the block and showed a clever arrangement of a side driveway in a center block location that allowed a side show window and gave many of the advantages of the corner location.

In considering the use of ramps or elevators, Mr. Young said that while the first cost of the elevator was considerably in excess of that of a ramp, yet the additional space used by the ramp in many cases used up valuable rentable or profitable space so that the saving in first cost was often offset.

On the other hand, it would often be possible to purchase additional ground with the money saved on the elevator in which case there would be an actual

saving. Mr. Young said that the maintenance and operating expenses of elevators varied with conditions and with the care used in keeping them in good running shape, whereas a properly built ramp required no maintenance or operating expenses.

### Second Day of Convention

The second day of the convention was devoted to the servicing and repair of engine bearings, rear axle gears and bearings and brakes. The first paper, "How to Properly Fit Pistons and Bearings," was read by Dan Andrews, service manager of the Continental Motors Corp., and in this paper he described and illustrated with lantern slides a considerable number of the modern tools and equipment for reconditioning main and rod bearings, pistons, piston pins, etc.

In substance, Mr. Andrews stated that the crankshaft should be used as the gage for all work on the lower rod or main bearings which are carried in the crankcase. Therefore, the surfaces of this shaft, when reconditioned or new, should not be more than .002 in. out of round and should not run out of true for

a greater amount. In addition to this, care must be used to insure that the crankcase is not distorted while the bearing bolts are tightened for either fitting or final assembly. Scraping when performed by an expert will produce excellent results, but the more modern methods of line reaming and boring are to be preferred because they will produce very much better results in a small fraction of the time necessary to scrape by hand.

Cylinders can be finished satisfactorily by any of the three methods of reboring, regrinding and honing, but each has its peculiarities that must be appreciated. Honing is satisfactory only after a boring cut which trues up the bore, according to Mr. Andrews.

Replacement pistons should be carefully balanced with each other in order to prevent subsequent engine vibration and the cylinder bores should be square and in plane with the lower rod bearing after assembly. Gap clearances at the ends of the rings should be equivalent to .001 in. for each inch of cylinder bore for all but the top ring, which should have an additional clearance of at least .004 in. The lateral clearance of the rings in their grooves should be tested with a feeler ribbon and should be equal all around and not exceed .002 in. When assembling the rebuilt engine, cleanliness is the outstanding demand. Dirt and chips must be eliminated or all the care exercised in fitting the various members will be nullified shortly after the engine is started.

### Three Phases of Existence

Col. H. W. Alden, chairman of the board, Timken-Detroit Axle Co., presented the paper on the rear axle gears and bearings. He said that the motor car passes through three distinct phases in its existence.

- 1—It is designed by somebody.
- 2—It is produced and distributed by some other people.
- 3—It gets into the hands of the user and then enters the phase of its existence which is one for the consideration of the convention.

Mr. Alden said that in many ways this third phase was the most important and that more and more was the success of the motor car company becoming depen-



F. C. Stanley





Carl H. Page

dent upon the kind of service which the user receives. Unfortunately, a majority of users are more or less ignorant of those things which a motor car ought to be reasonably expected to do and it is at this time that the ability of the service and of the business shows up.

According to Col. Alden, the service man and the designer are at opposite ends of a procession between which a great many foolish people are marching. Very often a poor automobile or even a good automobile is so misrepresented by an over-enthusiastic salesman that it cannot possibly make good and on the other hand an automobile which does not receive the proper owner care is sure to fall down even if it is not misrepresented in the selling.

Following Col. Alden's paper there was shown a two reel motion picture showing the proper methods of adjusting gears and bearings, each being preceded by pictures showing what happens when things are not properly adjusted.

Dr. F. C. Stanley, chief engineer of the Raybestos Co., spoke on the adjustment of brakes. The two most important features of brake adjustment—those in which a majority of jobs fall down, is in the failure to free up the brake anchor and pin and the failure to properly adjust the brake mechanism so that the pull rods are in the position of maximum efficiency when the brake is applied.

#### Eliminating Squeaks

Brake service stations report that in the majority of cases of inefficiency of brake action, there is no motion of the band possible at the anchor because of accumulated dirt and rust. Dr. Stanley believes that the oldest and simplest method of testing brakes is the best—that of locking the wheels. Brake squeaks are caused by local high areas and a perfect rounding of the band will eliminate squeaking.

Dr. Andrews was of the opinion that drum scoring resulted more from inferior metal in the drum than from anything else and recommended that hot rolled

metal with a higher carbon content and a scleroscope hardness of 35 at 750 deg. Fahr. be employed.

Service and technical relationships as typified by the desirable contact between the engineer and service department, the fundamental characteristics of metals with their relation to subsequent handling in the repair shop and the basic qualities of lubricants and bearings as related to car maintenance formed the subjects of the third service session. In addition to the various topics which were discussed a four-reel film tracing the progress of oils and greases from their geologic formation through the ramifications of drilling, refining and delivery to the customer was presented by Mr. T. A. Werner, chief engineer of the Tidewater Oil Co.

#### Personal Contact Stressed

Personal contact through visits to the various points in the field by responsible engineering executives, the broadcasting of semi-technical articles or definite instructions written by the engineer in the house organ and lectures were advocated as ready means for better co-operation and understanding between the two departments by T. J. Little, chief engineer of the Lincoln division of the Ford Motor Co., in his paper, "How the Service Man Can Co-operate With the Engineer."

Personal visits to the various territories by the engineer always return more than he gives and every chief engineer should have his program arranged to spend about as much time in the field as in the office. The possibility of this arrangement is diminished in many cases by the company's policy of bringing out new models annually. In cases of this sort, the engineer is necessarily engrossed in the demands of the new design to such an extent that prevents any opportunity of confirming the results of the last design. The problem of service is then left up to the service department, with little or no help from the fellow whose ideas they are attempting to make work.

On the other hand, better, more exact service reports from the field will help the engineer materially. A report based upon the word "defective" is absolutely valueless. What is required is facts which will give the engineer at the plant the complete picture of the situation and its contributing elements. The method of handling complaints from the field is naturally a service department problem, but outstanding cases should be reported in triplicate to the home office, one copy to the service department, one to the engineering and one to the manufacturing department. In this way a three-fold investigation should be started and results based upon all of the viewpoints involved should bring about the early identification of the source of the trouble and its cure.

Cold straightening or welding of important parts such as axles, steering gear components, etc., should not be attempted unless by an expert who knows how to heat treat the part after repair. This was the outstanding thought which was brought out by L. A. Danse, chief

metallurgist of the Cadillac Motor Car Co., in his talk on "The Effect of Heating Alloy Steel Parts." An analogy was made between iron and water to demonstrate the sensitive character of steel parts. Like water, iron exists in three states, solid, liquid and gaseous, the difference being chiefly in the temperatures at which the changes of state occur. An interesting portion of this talk was the review of steel production from the raw ore at the mines through the converters, blooming and bar mills and drop forge department and ultimately becoming part of an automobile.

#### Slides Shown

Micro-photographic slides were shown to illustrate the differences in the structure of various metals and the effects of correct heat treatment, overheating and cold working. The value of investigations of this sort in the control of parts for various types of service was emphasized. This control is the factor which distinguishes a reputable manufacturer's trademarked product from the so-called pirate part. The reputable manufacturer purchases steel to very close specifications and then controls its treatment for a particular service which he has studied, whereas the pirate parts maker is interested chiefly in the external form of the part for the purpose of fitting his product into the specified place. Cold working without subsequent heat-treating to restore the fine crystalline structure of the original condition destroys the strength of a part while welding as usually practiced is merely joining the two portions of the broken part by a cast section which usually contains an inordinate amount of dirt and some gas bubbles. Unless the welded patch is heat-treated to refine the structure and rectify the effects of overheating on the surrounding metal, the repaired part will be very much inferior to a replacement part supplied by the original manufacturer.



Wm. G. Eibens

## The Automobile Service Problem

Technique and style of design.....	Engineering Management Sales department Production department
Cost and marketability.....	Engineering Management Sales department Production department
Repairs and replacements.....	Engineering Management Sales department Production department Service department
Changes and improvements.....	Engineering Management Sales department Production department

After reviewing the fundamentals of bearing lubrication to show that the oiling of a bearing depends upon the pump effect of the revolving shaft and that under correct conditions no metal to metal contact exists but that the oil film adheres to both surfaces and is piled up between them, Dr. W. K. Lewis, the head of the department of Chemical Engineering of the Massachusetts Institute of Technology and chemical consultant, Standard Oil Co., discussed "The Effect of Poor Lubrication."

### Dr. Lewis Talks

The following is part of Dr. Lewis' talk:

"The practical problem of automobile lubrication reduces itself to the choice of that lubricant and the maintenance of those conditions of operation which will most satisfactorily lubricate both bearings and cylinder walls.

Viscosity is in a three-fold sense a factor of safety in lubrication. In the first place, the more viscous the oil supplied the bearings the greater load will that bearing carry without getting outside the range of fluid film lubrication. In the second place, when, with the more viscous oil, the safe load is temporarily exceeded, the more slowly does that oil



E. M. Young

squeeze out from the bearing and therefore the longer can the excess load be carried without danger of injury to the surface. Finally, an oil of proper body

holds the shaft more nearly centered with its bearings and any dust or grit which gets into the oil is less likely to injure the bearing surfaces.

"A more viscous oil uses up more power but the power lost in bearing friction in an automobile is such a slight fraction of the total that this price is a small one to pay for the increased safety and insurance against bearing trouble. It is, however, imperative not to employ an oil of viscosity so high that the oil distributing system available is unable to furnish an adequate supply to the bearings or that the machine will be too stiff to start when cold. It is better to have an abundance of oil of proper viscosity than insufficient oil of greater body.

"The rule for the choice of the viscosity of an oil for a car should be the most viscous oil which the distributing system can, under the worst conditions, adequately supply to the bearings themselves. Proper volatility, resistance to heat and to oxidation, absence of bodies causing emulsification, gum formation and other troubles, satisfactory characteristics in the field of partial lubrication, and other factors essential for satisfactory lubrication must all be considered.

"Abnormally low consumption always means high dilution, with resultant decrease in body of the lubricant and injury to the car. This evil effect of crankcase dilution is the reason for the policy, so often urged upon the motorist, or regular and frequent drainage of the oil from the engine, followed by thorough cleansing with proper flushing oil (not kerosene) and introduction of fresh lubricant.

"It is the duty of the service station to maintain the lubrication and oil distribution system of the car in perfect mechanical shape and of the motorist to keep the car supplied with oil of proper and adequate body and to see that that quality of oil is maintained by replacement at proper intervals of time, to insure against the evils of crankcase dilution."

## Birdseye View of Shop Equipment Afforded At Maintenance Equipment Show

BY B. M. IKERT

FOR the first time in the history of the automotive industry the men engaged in the servicing and maintenance of automotive vehicles were given the chance last week of viewing at a glance what the market afforded in the way of machinery, tools and other apparatus.

This was at the first Automotive Maintenance Equipment Show held in Detroit May 19-23 in connection with the National Automotive Service Convention under the auspices of the National Automobile Chamber of Commerce.

The exhibit included many forms of machine tools, portable tools, precision tools, floor equipment and stockroom fix-

tures representing the most advanced facilities for increasing the efficiency of the service station and repair shop. All told there were about 104 concerns exhibiting.

One of the outstanding facts brought out by the show was the great strides made in the development of accuracy in the machinery and tools used for maintenance. Whereas a year or two ago bearings in some of the machines were cast iron and of small size we find them in today's machines either of bronze or steel and of ample size to withstand considerable wear and tear. Each day we find maintenance equipment approaching more and more the accuracy

found heretofore only in machine shop equipment.

### Human Element Considered

A study of the machinery at this show revealed that the human element has been considered in the use of many of the devices. All mechanics do not have the same touch and what might be a slight turn of a handle to one would be considered too much by another. To that end much of the equipment has been so designed and built that regardless of the pressures exerted by different mechanics the results accomplished will be the same.

As an indication of the progress towards more accurate equipment the



case of connecting rod aligners might be cited here. Several concerns showed aligning devices of this kind which are far superior to anything yet brought out. In the past several such devices have not taken into consideration that tapered pistons when tested on a surface plate held at right angles to the arbor on which the rod is supported will not give a true reading as to the alignment of such a rod and piston. Better results are obtained with the devices wherein the alignment is secured with the piston pin. This checks both the bend and twist of the rod.

In one instance, the error in making a reading with a tapered piston is compensated for by a gage with an adjustable blade in it, so that regardless of the taper in the piston perfect alignment of the piston with the rod can be secured by first checking the one side of the piston against the blade and then turning the rod assembly completely around and bringing up the other side of the piston against the blade.

#### Another Feature

Another salient feature of the new connecting rod aligners shown is that with most of them the piston pin end and big end of the rods can be bored dead true while the rod is held in the fixture. One of these fixtures also has a clamping device with an eccentric cam in it so that the rod can be given a slight twist to straighten it. The beauty of this feature is that each movement of the cam will kink the rod just .003 in. so that the amount of kink can be controlled. It is well known, of course, that a great amount of bend in a rod easily can be taken out, but getting a bend of only .003 in. is a delicate job.

Other machines shown make it possible to pour the babbitt for the lower end of the connecting rod and then in the same fixture run a boring tool through it. More thought has been given to the design of base used with connecting rod aligners and boring outfits, so that when the devices are screwed to a work bench they will not be pulled out of alignment through unequal pressure from the hold-down bolts or screws.

Along with the connecting rod aligning and boring fixtures have come several excellent devices for doing main bearing work. These fixtures make it possible to set up the main bearing caps tight and then take a cut through the bearing so that there is absolute assurance that all bearings will be in alignment and of the same size. These fixtures, because they are faster and far more accurate, have relegated hand scraping methods out of the shop.

Some of these main bearing aligning and boring machines "locate" from the camshaft bearing holes in the block. This simply means that these holes are used for holding the bar which is in perfect alignment with the boring bar. Provision also is made on some to vary the distance between the centers of the boring bar and camshaft bar, thereby getting perfect mesh of the timing gears, usually between .002 and .004 in. It takes but a few minutes to prepare these

fixtures and run the boring bar through them and a job which formerly took several days can now be done in a few hours.

#### Some Other Forms

Some of the other forms of main bearing boring fixtures are made with micrometer adjustments so that the device can be set at the correct point in relation to the center of the main bearings. This is done to cut an equal amount of babbitt from the entire circumference of the bearing, which obviously would not be the case if the tool was cutting eccentric. While some of these main bearing boring fixtures are intended for certain makes of engines only, many others are universal and can be used by the shop which works on all makes of cars and trucks.

In speaking of connecting rod and main bearing work mention should be made of the progress in holding the cutters of these boring bars. In the past it was customary to simply insert the cutters in a slot in bar and hold them in place with set screws. It was up to the mechanic to see that all cutters projected the same, which often involved a certain amount of guesswork. To eliminate this guesswork and consequent chance for error the present tendency is to provide cutters with a seat to correspond with a machined seat on the boring bar and then holding the cutter in position with a screw. The screw, therefore, has nothing to do with positioning the cutter and acts as a locking medium only.

One concern has brought out a cutter which is made with two cutting surfaces, the first being used to rough out the bearing and the second to finish-bore. This being done in one travel of the bar through the bearings naturally eliminates the necessity of changing cutters and running the bar through twice. Incidentally this is another example of where the equipment maker has made it possible to cut down the time factor in doing bearing work.

Practically every form of cylinder reconditioning tool was shown; grinder, reborer, reaming and honing. Some of these machines were self-contained units in that they carried their own source of power, while others were set up with a portable electric drill as the means of power. The service men who are advocates of regrinding had a chance to look over a portable grinder made by a well known machine tool maker of this country and which aside from being a grinder for the cylinders can also be used to grind pistons.

#### These Are Popular

The reborer tools driven by portable electric drills seem to be the most popular form of cylinder reconditioning tool. For the most part these machines have been built with long guides for the boring bar to insure accuracy in getting the holes bored at right angles to the crankshaft line. It is especially desirable on the lower priced cars to recondition the cylinders without removing the engine block from the car and the bor-

ing machines when properly used go a long way towards attaining the desired end.

The honing of cylinders has made much progress in the last year and what has been said about reborer applies to some extent to the hone. Most of the service men look upon the hone as a finishing tool to be used after a cylinder has been rebored or reamed. On the other hand the exponents of the hone claim that the latter tools can be used to take out as much as .010 in. from the cylinder walls. Some service men and repair men state that their experience seems to indicate that the hone is a good operating tool up to .004 or .005 in., but that above these figures it is best to regrind or rebore.

To explain the above condition it is very likely that a hone naturally will cut faster the first few thousandths of an inch in the cylinder because the latter has worn tapered and naturally the hone does not cut over the entire length of the stones. Then, as the taper is taken out and the stones begin to cut over their entire length it is but natural that the cutting action will be slowed up.

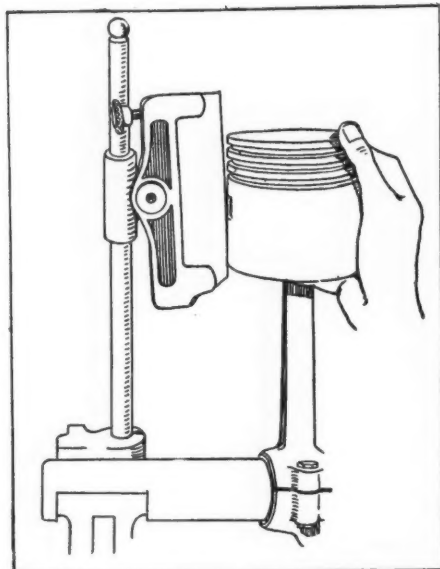
#### A "Human" Micrometer

One maker of a hone is preparing to bring out very shortly a micrometer device whereby the mechanic is able to determine exactly the amount of metal he desires to remove from the cylinder wall. This is another instance of where the equipment maker has taken the human equation into consideration in order to insure better results with his equipment and get a better job.

A rather novel cylinder burnishing tool and one which is said to overcome the difficulty of the stones "loading up" was shown by one concern. In this burnisher the stones are cylindrical and rotate against the cylinder wall in a spiral action brought about by the raising and lowering the hone. The stones also are made of a substance which has the faculties of breaking down after a certain amount of cutting action and polish of the walls has been secured.

Practically all of the well known makes of arbor presses were shown. These presses are probably the most useful tool in the shop and practically every major flat rate operation involves the use of an arbor press. In nearly every case these presses now have been provided with a supporting bar carrying V-blocks or centers for straightening shafts. A dial indicator also can be clamped to the supporting bar for ascertaining the trueness of the shaft after straightening. In this way the shaft does not have to be taken to a surface plate and press alternately after each application of the pressure screw.

One arbor press maker showed a device for straightening disk wheels. This essentially consists of a fixture which fits on the back of the press and which is provided with a support to hold the center of the wheel. The rim of the wheel comes in line with the center of the pressure screw and a slight pressure on the operating bar exerts a downward thrust on the rim and removes any kinks.



1—This shows how it is possible to check the alignment of a piston even though the latter is tapered. The adjustable blade makes it possible to check both sides of the piston, regardless of whether the piston is tapered or straight

The high spots in the rim can be located by a gage immediately under the rim.

#### Air Compressors on Hand

A half dozen or more makers of air compressors were on hand and the exhibit of their apparatus suggested amongst other things the possibilities of compressed air for other than strictly tire inflation purposes.

These compressed air outfits for the most part are pretty compact pieces of equipment and their installation is comparatively simple. Probably the best plan is to run an air line to each mechanic's place at the bench with sufficient hose at each point to reach entirely around the vehicle being worked upon.

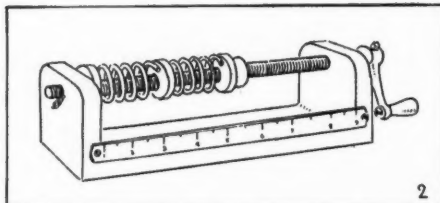
There is also the matter of using compressed air in connection with a spraying brush for the application of paint to a car, the latter having first been cleaned with the air stream.

A survey of the show shows clearly that the makers of electrical test apparatus are making a strong plea for the service station to add this particular phase of the business to its other lines of work.

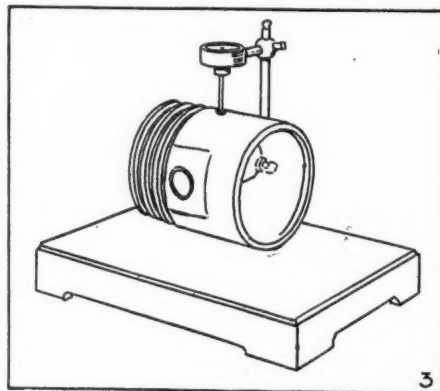
Many dealers and service stations, repair shops, etc., have added electrical service to their business because they have felt that to give their customers one hundred per cent service they must add electrical work. With the proper kind of test equipment it is possible for the shop to tell quite readily the nature of any trouble which may have developed in the electric system and as to what steps are necessary for correction.

#### Less Danger—That's All

The replacement of worn bearings in a generator or starting motor is not fundamentally different from that of replacing a pilot bearing in a flywheel. Soldering the leads on a commutator is no different from soldering a gasoline



2—A new piece of equipment which one maker showed was a valve spring tester by means of which the condition of all valve springs can be ascertained before the engine is reassembled. The spring to be tested is compared with a master spring and should be the same length as the latter when one or the other is fully compressed



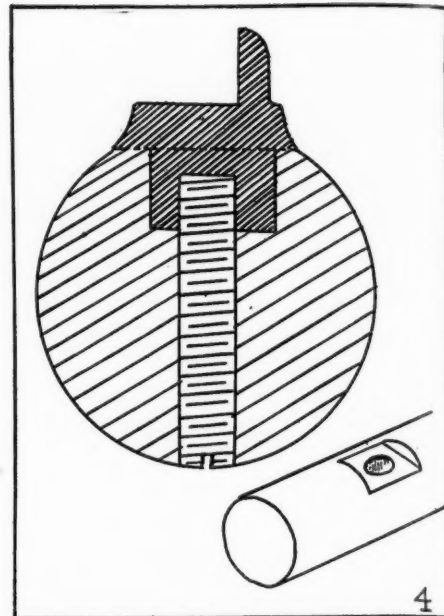
3—In the past many cases of trouble developing after an engine has been assembled have been traced to pistons being out of round, caused by a tight fitting of the piston pin. After a pin is inserted in a piston the latter should be checked for roundness. This can be done with a surface plate and dial indicator as shown

tank, excepting that there is less danger of going through the roof. Undercutting a mica between the commutator segments is no trick and chucking a generator on a test bench to see how it performs when revolved the same as it will be when on the car is simple after the operator knows that the instrument ought to show a certain amount of charge at certain speeds.

The test benches of most makers have been greatly simplified over those of a few years ago and yet it is possible to do more real work with them. The prices are lower than formerly and the workmanship far better. Some of the benches are for doing work on one particular make of electric system only, but in the main the benches are universal. One of the newer benches is made with a universal attachment between the motor and device to be tested. This being a sort of double universal joint and fitted with a sliding support which allows a considerable up and down motion, takes all thrust and driving strain off the generator or starting motor under test.

#### Out of Luck

Judging from the equipment at the show the shop which in the future does its valve work by other than machine methods will, to use a common term, be "out of luck." At the present time there are several excellent electrically-driven valve lathes which will resurface the face of a valve in less than a minute. And, most of these lathes



4—Much progress has been made in the matter of cutters for boring bars. Guesswork in the setting of cutters has been eliminated in some instances of so making the cutters that they have a seat in the bar and the screw serving as a holding member only and not as a position member.

have a centering device whereby there is assurance that the stem of the valve will be properly held in relation to the head.

A small device and yet one which has a far reaching effect was the valve spring tester shown. A service man often is confronted with an engine which does not perform satisfactorily and yet the trouble is difficult to find. An analysis of this sometimes shows weak valve springs to be the cause. The apparatus for testing springs mentioned above consists merely of a supporting base which has two vertical arms at its extremities. Through these arms passes a threaded shaft which has a crank at one end. The spring to be tested is slipped over the shaft and a washer placed between it and what might be called a master spring of known quantity. Turning the handle compresses the springs and when the master spring or the other is fully compressed the lengths of the two are measured on a scale.

#### Line of Wrenches Shown

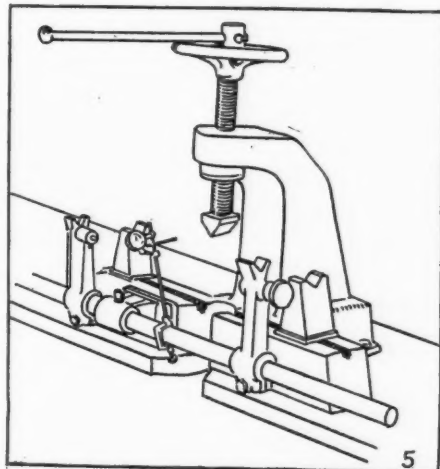
An excellent line of wrenches was shown. There were the well-known forms of speed wrenches, long handled tappet wrenches and the special wrenches intended for difficult places. Probably one of the handiest wrenches shown was that intended for the stuffing nut on water pumps. These nuts being of a large size usually do not permit the use of an open end wrench or regular form of monkey wrench. Consequently a wrench has been brought out which resembles an open end wrench and yet which has but a short handle. Inasmuch as the water pump gland nuts usually are not set up very tight little effort is required to loosen or tighten them and consequently these wrenches can be made small.



Broaching which heretofore has been largely a machine shop and production proposition has been brought to the realms of the automotive shop. One concern is showing a line of broaches for piston pin bushings and for the big ends of connecting rods. The process is very simple and the broaches are used in an arbor press, being forced through the bushing under pressure. A very fine surface on the bearing metal is obtained by broaching and many prefer it to reaming. Most of the broaches shown will fit standard and oversize piston pin bushings and others may be had for various sizes of connecting rod bearings.

#### Precision Tools Shown

One of the gratifying things at the exhibit was the display of one of the oldest makers of precision tools. This in itself is evidence that more than ever the work of maintaining automotive vehicles is being looked upon as an art which requires precision tools just the same as are used in the machine shop. When accurate calipers, micrometers, surface gages, combination gages, dial indicators, internal micrometers and similar forms of instruments are seen at an exhibit, there is every assurance that this question of maintenance of automotive ve-



5—Most of the presses for automotive shops are now equipped with V-blocks on bars and dial indicators. This makes it possible to straighten and test a shaft without removing the latter from the press

hicles involves as a starting and checking point the use of such apparatus as has been heretofore only been found in the kit of the machinist and toolmaker who is used to working to very close limits.

While some of the equipment shown

has been on the market for quite a time there have been improvements going on right along in it. Mention is made of a wheel and gear puller of the type wherein two arms are connected by a cross member and a threaded shaft placed in the center of this cross member. Turning the shaft inwards, of course, forces the gear or wheel off as the case may be. Some objections have been raised to these forms of pullers in the past that they have a tendency to slip off as the pressure on the screw shaft becomes greater. To offset this one company has provided its puller with two arms which are connected to the pulling arms and which are joined at the center to a fitting through which the screw shaft operates. In this case when the pressure becomes great the auxiliary arms tend to pull the pulling arms closer to the part being removed and a good hold is thus assured.

Inasmuch as most of the equipment exhibited at the show was described in the Summer Service Number of Motor Age of May 15, no detailed descriptions are set forth in this article. Some of the newer pieces of equipment brought out at the show will be described in forthcoming issues.

## The Part the Engineer Plays in Service and Maintenance

THE part that engineering plays in service and maintenance of automotive vehicles was the chief topic of discussion at the Detroit sectional meeting of the Society of Engineers held here tonight in connection with the first automotive maintenance equipment show and national automotive service convention.

That the engineer can do a great deal towards the simplification of the service problem after the product gets into the hands of the owner was brought out by each of the four speakers.

The cost of maintenance to the car owner must be kept as low as possible and this in turn means that the car should be so designed that the parts requiring more or less frequent adjustment or replacement must be easy to get at. It is decidedly wrong, for example, that an owner should be obliged to pay a labor charge of \$20 or \$25 for the installation of a part costing but \$1.25.

#### The Best Road Test

Among the thoughts coming out of the meeting was the one that engineers in the past have confined their efforts too much to matters of detail regarding the design of the vehicle and have not given sufficient attention to the performance of the vehicle in the hands of the owners over a long period of time. As one of the speakers said, the nation-wide use of the car is the best road test that can be obtained.

There were four speakers, consisting of H. N. Davock, Packard Motor Car Co.; Don T. Hastings, Williams & Hastings, Hupmobile dealers in Detroit; O. E.

Hunt, chief engineer Chevrolet Motor Co., and W. T. Fishleigh, Ford Motor Co.

The point stressed by the first speaker, Mr. Davock, was that in most cases the service men and owners do not appreciate the fact that the factory often is called upon to service, at a definite loss, parts which have gone out of production. This means that the price of an obsolete part will naturally go up because production has ceased on it and running through a few of such parts obviously entails considerable expense.

The speaker said that individual help from the factory was a rather difficult thing to extend to the dealer or car owner because after all it is largely up to the dealer's organization to thresh out troubles with car owners. The factory is not familiar with the details of transactions involved and, therefore, cannot extend individual help.

Mr. Davock spoke at some length on the matter of flat rate prices for maintenance work and also told how the Packard company had designed special tools and equipment to be placed in the hands of distributors and service stations in order that the flat rate schedules easily might be met. This, of course, is a good instance of where the engineering department of the factory and the service department co-operate to get the cost of operation and maintenance of the car when in the hands of the owner to the lowest figure possible.

Don T. Hastings emphasized the point that after all has been said and done a motor car is a compromise. All of the

features desired by the engineering department cannot be incorporated into one design and the result is that one part may interfere somewhat with another when it comes to servicing such a car. He did say, however, that it was unpardonable to bring out a design wherein it was necessary to spend many hours in disassembling and reassembling to install a part costing but a small sum. He stated that the owner of the car should not be penalized because of a glaring error made in the design of the car. Such constructions do not serve to cut down the cost of maintenance of the vehicle.

#### Car a Compromise

To look upon the motor car as transportation service rather than a transportation unit was the new thought given by O. E. Hunt. And in this he said that the operating costs and maintenance costs obviously played a major part. The engineer should get all the information he can from the people using his car and to that end the best information is that coming from a nation-wide use of the car. This is far better than local tests, because of the greater range of conditions and the diversity of operation.

Mr. Hunt cited figures showing the average operating costs of a medium-priced car which had covered some 20,000 miles. There are three things, he said determining the cost per mile—which is the real way of ascertaining the efficiency of the vehicle as a transportation service. These things are fixed cost, operating cost and maintenance.

The fixed cost takes in such things as depreciation, taxes, license fees, interest on investment, etc. The operating cost relates to gasoline, oil, tires, etc., and the maintenance cost takes in the things caused by natural wear, carelessness and abuse. The latter figure naturally can be cut down to a minimum by good design and accessibility.

#### Division of Cost

The division of the three kinds of costs on the vehicle mentioned above was as follows:

.02 cents for operating.  
.035 " " fixed cost.  
.035 " " maintenance.

.09 " total cost per mile of operating vehicle.

The above figures were taken from the records of the vehicle before mentioned and which was driven as a demonstrator. The driver paid the maintenance costs,

etc., out of an expense account and all conditions were much the same as they would be with the car in the hands of an average user.

Mr. Hunt said that a service engineer was a desirable asset to an engineering department. Such a man can chase down difficulties as they come up in the field and can then carry back an unbiased opinion directly to the engineering department of the factory. He said in the past it has been difficult to get the truth about such matters, especially when the information passes through a half dozen persons before getting to the right parties involved. The service engineer operating directly in the field seems to be the logical solution.

Getting the correct viewpoint of the service problem is the most important work of the engineer, said W. T. Fishleigh. The speaker said that one of the troubles in the past has been that engi-

neers have been too prone to stick only to the drawing board. They have been over technical and have worried along too much about size and type of clutches, for instance, rather than to the reliability of a clutch and one that can be made for a few dollars rather than one that costs considerable money to make.

He likened the service problem, so far as the engineer is concerned, to a picture painted by an artist. The artist stands off at a distance every now and then to get the effect of the whole thing. His brushmarks mean little if the whole picture is not what he wants when he gets through. Likewise the engineer may be so wrapped up in details that his car is not what he wants when it gets out into the hands of the owners. The engineer who gets out on the road will have a much better conception of what the public wants than he who sticks to his draughting room.

## Association Activities Discussed

**T**AKING advantage of the interest centering in Detroit, which brought together representatives of the automotive industry from all parts of the United States, the management of the National Automobile Dealers' Association held a conference of trade association secretaries and managers on Tuesday and presented a program which was a continuation of the study of trade association activities commenced at the conference held in Chicago last summer.

This conference brought together 34 secretaries, managers and representatives of automotive trade associations. Considered in connection with the other activities of the week it was said by those who attended to have been of great value to them as the men directly responsible for administering and directing the affairs of the various trade organizations.

In the absence of C. A. Vane, general manager of the N. A. D. A., the conference was presided over by Lynn M. Shaw, assistant general manager. Mr. Vane was prevented from attending by the illness of a member of his family.

#### Service Was Keynote

Service was the keynote of this convention. The word, however, was applied chiefly to the enterprises which a trade association may carry on for the benefit of its members. One of the activities which a number of automotive trade associations carry on is an employment bureau. This subject was discussed by C. C. Proctor, manager of the Buffalo Automobile Dealers' Association, which conducts a very successful employment service for its members.

Harry T. Gardner, manager of the Cincinnati Automobile Dealers' Association, discussed the use of sales and news letters as an association activity. He issues a bulletin to his members at intervals containing short, bright paragraphs directed at the prodding of sluggish salesmen into renewed energy. He has found this to be very useful in maintaining interest in the association.

Claude E. Holgate, manager of the Newark Automotive Trade Association, talked about savings and loan and salesmen's schools as trade association undertakings. He told of the successful operation of the savings and loan department of his own association and of its trial of a school for salesmen. The salesmanship school was inaugurated for the purpose of training new salesmen and was not open to those already in the business. A course was presented covering 32 evening lessons at a cost of \$50 per man. The course was recently completed and 51 men who finished were placed in positions. A record of the work of these men is being kept to determine if possible the effectiveness of the course.

#### Savings and Loans and Schools

Trade association activities in general were discussed by Herbert Buckman, manager of the Cleveland Automobile Dealers' and Manufacturers' Association. Mr. Buckman divided the activities into two classes—internal, having to do with the relations of the members to one another and to their central organization, and external, having to do with the relations of the trade to the public.

Among worth while internal activities he listed used car information, shows, regular meetings, advertising information, insurance service, employment bureau, legal department, new car registration statistics, bulletins, delivered price lists and a general information bureau for the use of all members. Among external activities he named the shows as they concern the public, legislation, roads and traffic, newspaper contact, and propaganda for fair appraisal of used cars. He urged that all association managers should strive in every way to improve themselves and make themselves of greater value to their organizations.

John Eustis of the Automotive Service Association of New York City told how flat rate and piece work have improved service and made the public more satisfied with the repair jobs that come out of the shops. He said that every dealer ought to aim at servicing 100 per cent of all the cars of the make he sells in his territory. He knows of one member of his association who services 70 per cent, but others admit they do not service more than 40 per cent.

(Continued on page 50.)



Secretaries and managers at N. A. D. A. meeting



# Five Thousand Miles of Racing

By PAUL DUMAS

*In this article Mr. Dumas has written a review of eleven International Sweepstakes Automobile Races at Indianapolis and shows how design first tried in the Speedway competitions has been transplanted to every-day use.*

ON the eve of the great International Sweepstakes 500-mile race at Indianapolis May 30, the question naturally arises, "What has been the influence of this race, in the many years that it has been held, upon the progress of the automotive industry?"

Does racing car design affect the design of stock cars? Do the present-day speedways teach any valuable lessons that tend to directly improve the quality of our stock cars? That the reader may form his own conclusions, there is set down in this article the condensed statistics of ten races run off at the Indianapolis Speedway previous to 1923.

The first 500-mile International race was held on the Indianapolis Speedway in 1911 and starting with that event, it is proposed to show at least one point regarding the interrelation between race and stock car design. The point in question is this: Long distance racing is the surest method for determining the status of stock car materials. In other words, a new piece of metal, a bit of wood designed for a special purpose, or a new type tire, proposed as a better material for use in stock cars is given the final approval or rejection in the realistic laboratory of racing.

## Race Car Evolution and the Trend of Stock Car Design

From the race cars of 1911 to the speed creations of the present day there has taken place a process of evolution which is the almost exact parallel of the design trend in the stock car field. Along with this process of evolution of design there has come about a gradual yet noticeable change in "public opinion" regarding the automobile as a means of high speed transportation. The public is year after year demanding a better car, a more comfortable car and a cheaper car.

The opening paragraphs of the articles reporting the successive Indianapolis races give some idea of this gradual change of opinion in the minds of the technically trained and are indications of a similar evolution in opinion that has reached to the public at large. The opening paragraphs quoted hereafter are taken from the issues of Motor Age immediately following the respective races.

### The First Race—1911

INDIANAPOLIS, May 30, 1911.—Speedway champion of 1910, Ray

Harroun of Chicago, driving the six-cylinder Marmon Wasp and relieved for 100 miles by Cyrus Patschke, made good his title today by defeating the best field of cars and drivers ever brought together in this country, winning the 500-mile race on the 2½-mile speedway here at an average speed of 74.7 miles per hour, A

## MARK FAR ABOVE THAT ANTICIPATED BY EVEN THE MOST OPTIMISTIC OF THE RACE FANS.

The last line of the above tells a story all by itself. Look at the boiled-down statistics of the race in the table below and you will understand what we mean when we say that racing cars have undergone some evolution.

### STATISTICS OF THE 1911 500-MILE RACE

Open to cars with a piston displacement of 600 cu. in. or under.

Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Displace.	Time	M.P.H.
1	32 Marmon, Harroun	6	4½	5	447.1	6:42:08	74.59
2	33 Lozier, Mulford	4	5¾	6	544.6	6:43:51	74.29
3	28 Fiat, Bruce-Brown	4	5	7½	589.0	6:52:29	72.73
4	11 Mercedes, Wishart	4	5.1	7.1	580.2	6:52:57	72.65
5	31 Marmon, Dawson	4	4.5	7	445.3	6:54:32	72.34
6	2 Simplex, R. DePalma	4	5¾	5¾	597.2	7:02:02	71.13
7	20 National, Merz	4	5	5 11-16	436.8	7:06:20	70.37
8	12 Amplex, Turner	4	5 5-16	5	443.3	7:15:56	68.82
9	15 Knox, Belcher	6	5	4¾	559.1	7:17:09	68.62
10	25 Jackson, Cobe	4	5	5½	431.9	7:21:50	67.90
11	10 Stutz, Anderson	4	4¾	5½	389.9	7:22:55	67.73
12	36 Mercer, Hughes	4	4¾	5	300.7	7:23:32	67.62

Running at the finish—Firestone, Frayer; National, Wilcox; Mercer, Bigelow; Interstate, H. Endicott; Vellie, Hall; Benz, Knipper; Benz, Burman; Simplex, Beardsley; Fiat, Hearne-Parker; Pope-Hartford, Fox; Cutting, Delaney; Jackson, Tower; McFarlan, Marquette; Cole, W. Endicott.

Also started—National, Aitken, 125 laps; Case, Jones, 122; Case, Strang, 109; Apperson, Lytle, 82; Alco, Grant, 51; Buick, C. Basle, 46; Pope-Hartford, Disbrow, 45; Buick, A. Chevrolet, 30; Fiat, Bragg, 24; Jackson, Ellis, 22; Lozier, Tetzlaff, 20; Amplex, Greiner, 12.

Entered but did not start—Fal, Pearce; Fal, Gelnow; Lozier, Van Gorder, scratched; McFarlan, Clemens; Vellie, Gibbon, and Cole, Jenkins, failed to qualify.

Note the displacement of DePalma's Simplex. These monsters of 1911 were slow-speed, hard-hitting modified stock cars. Probably in a pinch their engines would wind up to the then high speed of 2000 revolutions per minute. They weighed in the neighborhood of 2700 pounds and were hard to handle.

The year 1911 was the year of the wood wheels which were modified for racing by installation of the Michelin "quick detachable rim." It was not remarkable that there were approximately 50 tire changes during the running of the 1911 and 1912 events.

At about this time there was the question of chain drive versus shaft drive. Mercedes, Fiat, Simplex and Benz were building chain drive cars with tremendous engines of a brake horsepower that was considered by them too high for transmission by shaft. A shaft drive car copped the honors and the Amplex which annexed eighth was a two-cycle, practically stock, job.

The cord tire was unknown at this time and tires were perhaps the second greatest factor in determining who would win.

Bring to your mind a picture of the average stock car of 1911 and you can excuse and be surprised at the performance of these race jobs of 1911.

### The Second Race—1912

This is the opening of the Motor Age lead story covering the 1912 race:

### INDIANAPOLIS, May 31, 1912.—

For the second time an Indianapolis-made car has captured the honors in the 500-mile race which has become the great American motoring classic, Joe Dawson, driving a National, leading home a field composed of 24 cars, only ten of which finished in the five century grind yesterday. RECORDS WERE BROKEN FROM THE FIRST TO THE LAST MILE, and a crowd estimated as larger than last year paid \$180,000 to see the spectacle.

## STATISTICS OF THE 1912 500-MILE RACE

Open to cars with a piston displacement of 600 cu. in. or under.

Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Piston Displace.	Time	M.P.H.
1	8 National, Dawson .....	4	5	6 1/4	490.8	6:21:06	78.7
2	3 Fiat, Tetzlaff .....	4	5	7 1/2	589.0	6:39:25	76.7
3	21 Mercer, Hughes .....	4	4 3/8	5	300.7	6:33:09	76.3
4	20 Stutz, Merz .....	4	4 3/4	5 1/2	389.9	6:34:40	76.0
5	18 Schacht, W. Endicott .....	4	4 3/4	5 1/2	389.9	6:46:28	73.3
6	2 Stutz, Zengel .....	4	4 3/4	5 1/2	389.9	6:48:31	73.2
7	14 White, Jenkins .....	6	4 1/4	5 3/4	489.4	6:52:38	72.7
8	22 Lozier, Horan .....	4	5 3/8	6	544.6	6:59:38	71.4
9	9 National, Wilcox .....	4	5	7 1/2	589.0	7:11:30	69.6
10	19 Knox, Mulford .....	6	4.8	5 1/2	597.16	8:53:00	56.2

Also started—Mercedes, R. DePalma, 198 laps; Cutting, Burman, 156; Mercedes, Wishart, 92; Simplex, Dingley, 155; Lozier, Matson, 107; Stutz, Anderson, 79; Marquette, Leisaw, 63; Case, Hearne, 54; Firestone, Rickenbacker, 44; National, Bruce-Brown, 25; Lexington, Knight, 7; Opel, Ormsby, 5.

Entered but did not start—Mason, Lee-Oldfield; Shambaugh, Shambaugh, and Continental, unnamed, failed to qualify.

This was 1912 and the four-cylinder engine was in the ascendancy. The speed average had been stepped up four miles and the piston displacement limit was still 600 cubic inches, a much larger engine than any of our present stock cars.

A shaft driven car won the race after DePalma with the chain driven Mercedes was forced out at the 198th lap from a broken connecting rod.

Note the showing of the engines under 400 in. displacement and then notice how these smaller engines performed the next year.

The cars for this year were a little better balanced and some drivers had blown tires on the turns without mishap. One car went as far as 375 miles without a change of tires.

## The Third Race—1913

Beginning with the 1913 event we see the first indication of a new school of racing car design.

This is what MOTOR AGE had to say when the race was finished:

## INDIANAPOLIS, May 31, 1913.—

Coming to America with the title of the "fastest car in Europe," the Peugeot yesterday added to its laurels by winning the third annual 500-mile race on the big brick oval and Jules Goux sails home with \$20,000 in cash given him by the Speedway management. Although the speed average was not up to the mark set last year Goux was not pressed hard enough to extend his mount to anything resembling maximum speed.

## STATISTICS OF THE 1913 500-MILE RACE

Open to cars with a piston displacement of 450 cu. in. or under.

Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Piston Displace.	Time	M.P.H.
1	16 Peugeot, Goux .....	4	4.246	7.875	448.13	6:35:05.00	76.92
2	22 Mercer, Wishart .....	4	4.370	5.000	299.00	6:58:13.40	73.49
3	2 Stutz, Merz .....	4	4.813	5.500	399.97	6:48:49.25	73.38
4	9 Sunbeam, Guyot .....	6	3.540	6.290	367.52	7:02:58.95	70.92
5	23 Mercedes-Knight, Pilette ..	4	3.937	5.118	251.33	7:20:13.00	68.14
6	12 Gray Fox, Wilcox .....	4	4.750	5.500	389.90	7:23:26.55	67.65
7	29 Mercedes, Mulford .....	4	4.489	7.087	448.66	7:28:05.50	66.95
8	31 Case, Disbrow .....	4	5.100	5.500	449.00	7:29:09.00	63.08
9	35 Mason, Haupt .....	4	4.316	6.000	350.50	7:52:35.10	63.47
10	25 Tulsa, Clark .....	4	4.752	5.500	340.10	7:56:14.25	62.99

Running at the finish—Keeton, Burman.

Also started—Stutz, Anderson, 187 laps; Mason, Evans, 158; Anel, Liesaw, 148; Mercer, Bragg, 128; Henderson, Knipper, 125; Isotta, Tetzlaff, 118; Case, Nikrent, 67; Mason, Tower, 51; Isotta, Trucco, 39; Nyberg, Endicott, 23; Peugeot, Zuccarelli, 18; Mercer, R. DePalma, 15; Isotta, Grant, 14; Schacht, Jenkins, 13; Stutz, Herr, 7; Case, Endicott, 1.

Entered but did not start—Smada, Adams; Deltal, Dawson; Pennebaker, Pennebaker, scratched. Shambaugh disqualified for infraction of A. A. A. rules.

The above statistics give a good indication of the trend of the times. This was the first year of the 450 cu. in. limit, but only three of the cars that finished were within two inches of the maximum.

Practically all cars were equipped with

wire wheels this year and one or two cars were equipped with foreign-made cord tires.

The big light of the year, however, was that the foreign invasion marked the beginning of a change of theory regarding

engine design. The new idea, doubtless, was forced into being by the performance of the Peugeot. It was more or less of a surprise to see a four-cylinder engine with three bearing annular ball supported crankshaft. Peugeot had not stopped with a new shaft design and the outstanding feature of the engine was the fact that it could revolve easily at 2900 r.p.m. and that it was fitted with four valves for each cylinder. Then there was the lubrication system using pressure with a scavenger pump to keep the sump dry. There was some skepticism regarding the ability of such an apparently complicated mechanism to withstand the hammering of 500 miles of almost full load work.

Ralph Mulford startled everyone by going the full distance on his old Mercedes without a single tire change.

Guyot's Sunbeam, a long, thin, black car, had too much wheelbase for the track, but was second only to the Mercedes-Knight for smoothness and quiet running.

Pilette's Mercedes, which was by far the smallest engine (251.33), averaged almost twenty miles per gallon and made only one mechanical adjustment, that being a change in setting of the carbureter.

Peugeot had started something and the four valves per cylinder idea had set American designers to thinking, as we will see by turning to the results of the 1915 race. However, the 1914 race was run off in the interval.

## The Fourth Race—1914

The year 1914 brought humiliation for the Americans and MOTOR AGE had this to say regarding the affair:

## INDIANAPOLIS, May 30, 1914.—

Crossing the seas to fight out their feud of long standing which the road races of Europe had been unable to settle, the Delage triumphed over Peugeot in the fourth annual International Sweepstakes run off Saturday on the Indianapolis Speedway. Added to this was still another humiliation for the United States—the 500-mile speedway record of 78.8 miles an hour was smashed not only by the winner but by the other three foreign entries who followed him home, the top notch figure being 82.47 miles per hour.

The Stutz sixteen-valve fours had not been completed for this race and the race is shown in condensed form on the next page.

## THE 1924 RACE

*The results of the 1924 race will be known about the time this issue of MOTOR AGE reaches its readers, the day of the race being the day following publication of this issue.*

*The MOTOR AGE staff will cover fully, the race this year, as in the past and a complete study of the race from every angle will appear in the next issue of MOTOR AGE.*





Ray Harroun was a pioneer of the streamlining idea as shown in the 1911 winner above. Compare this with the illustration of the present day 91-in. job on page 24

#### STATISTICS OF THE 1914 500-MILE RACE

Open to cars with a piston displacement of 450 cu. in. or under.

Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Piston Displace.	Time	M.P.H.
1 16	Delage, Thomas	4	4.13	7.08	380.2	6:03:45	82.47
2 14	Peugeot, Duray	4	3.07	6.18	183.0	6:10:24	80.99
3 10	Delage, Guyot	4	4.13	7.08	380.2	6:14:01	80.20
4 6	Peugeot, Goux	4	3.94	7.08	345.0	6:17:24	79.41
5 3	Stutz, Oldfield	4	4.80	6.00	434.3	6:23:51	78.15
6 9	Excelsior, Christiaens	6	3.80	6.20	446.6	6:27:24	77.14
7 27	Sunbeam, Grant	6	3.14	5.90	273.0	6:36:22	75.69
8 5	Beaver Bullet, Keene	4	5.10	5.50	449.4	6:40:57	74.82
9 25	Maxwell, Carlson	4	4.20	8.00	445.3	7:02:42	70.96
10 42	Duesenberg, Rickenbacker	4	4.40	6.00	360.5	7:03:34	70.83

Finished—Mercedes, Mulford; Duesenberg, Haupt; Keeton, Knipper.

Also started—Peugeot, Boillot, 148 laps; Bugatti, Friedrich, 134; Burman, Disbrow, 128; Mercer, Wishart, 124; Stutz, Cooper, 118; Mercer, Bragg, 117; King, Klein, 87; Braender, Chandler, 69; Gray Fox, Wilcox, 67; Mason, Mason, 66; Burman, Burman, 47; Marmon, Dawson, 46; Stutz, Anderson, 42; Isotta, Gilhooley, 40; Maxwell, Tetzlaff, 38; Sunbeam, Chassagne, 20; Ray, Brock, 5.

The European school showed its full teeth in this race. High-speed engines turning up to as many as 3000 revolutions featured the cars that finished in the first four positions. Delage was not radically different from Peugeot except that one of them was fitted with positive closing valves.

The high lights of the race were the unfortunate accidents of Dawson and Boillot.

At the 148th lap with about half a mile lead for first place Boillot's Peugeot threw a tire. Rolling along the concrete retaining wall for several hundred feet the tire made a left turn and came across the track at right angles striking the Peugeot in the center with sufficient impact to break the frame. But for this

accident Boillot might have won and the race might have been made more competitive.

Practically everyone is familiar with the details of Joe Dawson's crackup in the 46th lap. He was forced into a collision with Gilhooley's Isotta which had previously thrown a tire and which was stretched out broadside of the track. Although he suffered a broken back and was confined to the hospital for several months, Dawson recovered and is living today.

From a technical standpoint the race was another engineering victory for Peugeot, due to the fact that Duray on the 183-in. job finished second only to a car with more than double the displacement.

#### STATISTICS OF THE 1915 500-MILE RACE

Open to cars with a piston displacement of 300 cu. in. or under.

Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Piston Displace.	Time	M.P.H.
1 2	Mercedes, R. DePalma	4	3.620	6.500	274.0	5:33:55.51	89.84
2 3	Peugeot, Resta	4	3.620	6.670	276.0	5:37:24.94	88.91
3 5	Stutz, Anderson	4	3.800	6.480	295.3	5:52:27.58	87.69
4 4	Stutz, E. Cooper	4	3.800	6.480	295.3	5:46:19.36	87.11
5 15	Duesenberg, O'Donnell	4	3.980	6.000	299.0	6:08:13.27	81.47
6 8	Peugeot, Burman	4	3.650	7.100	296.0	6:13:19.61	80.36
7 1	Stutz, Wilcox	4	3.816	6.484	298.5	6:14:19.73	80.14
8 10	Duesenberg, Alley	4	3.980	6.000	299.0	6:15:08.01	79.97
9 19	Maxwell, Carlson-Hughes	4	3.750	6.750	298.0	6:19:55.90	78.96
10 7	Sunbeam, Von Raalte	4	3.700	6.300	274.0	6:35:23.43	75.79

Finished—Emden, Haupt.

Also started—Sunbeam, Grant, 184 laps Maxwell, Orr, 168; Sunbeam, Porporato, 164; Sebring, J. Cooper, 154; Duesenberg, Mulford; Peugeot, Babcock, 117; Kleinart, Klein, 111; Maxwell, Rickenbacker, 101; Cornelian, Chevrolet, 76; Delage, R. DePalma, 41; Mais, Mais, 23; Bugatti, Hill, 20; Purcell, Cox, 12.

None of the American cars were fast enough to provide a race for the foreigners and with this the second victory for the high-speed multiple-valve engine America awakened and decided to tear the page from the foreign design textbooks. Mercer, the Duesenbergs and the Wisconsin Engine Co. provided the bulk of the engines used this year and to them fell the lot of building defenders for 1916. At the same time the Speedway management announced a reduction in displacement limits from 450 to 300 cu. in.

#### The Fifth Race—1915

In 1915 America started its long uphill fight to regain lost honors. The showing of the two previous years was improved but the goal was not attained. The MOTOR AGE story of the race is quoted here:

INDIANAPOLIS, May 31, 1915.—

Ralph DePalma, a hero in defeat, was a hero in victory at the Indianapolis Motor Speedway this afternoon. At the wheel of a new Mercedes the Italian proved that he and not fate was the master of his destiny by winning the fifth annual International Sweepstakes in the UN-DREAMED of time of 5 hours, 33 minutes, 55.5 seconds. His average for the 500 miles, 89.84 miles an hour, SHATTERING TO BITS the record of 82.47 established last year by Rene Thomas.

In glancing over the statistics of the 1915 race it will be noted that America managed to annex third. Although not shown on the list, it is significant that as in the year before, the cars to finish in the first four positions were 16-valve jobs. Mr. Milbraith of the Wisconsin Engine Co. had promised to build something fast for Stutz and he did. The Stutzes, three of which were entered and started, were as fast as the winner and two of them qualified in the front row. They followed in general principle the features of the Peugeot of 1914 and considering the newness of the design made an excellent showing. Wilcox's car finished the race on two cylinders.

If the American cars were fast they lacked the niceties of construction that characterized the mounts of Resta and DePalma. It may have been a question of balance, of lubrication, or of the physical properties of the different metals because none of our cars possessed the smoothness and regularity of the German and French creations. The race will stand out as being the greatest from a competition standpoint. Resta and DePalma were never more than 300 feet apart after the 300-mile mark had been passed.

Resta bent a steering knuckle near the end of the race and this alone prevented him from winning because it was apparent that he had a shade more throttle than the Mercedes.

The Mercedes finished the last mile with a large hole through the crankcase made by a connecting rod that had parted company with the crankshaft.

The 16-valve engines had proved themselves and the Stutz, finishing in third place, had averaged better than any of the old eight-valve jobs. Seven of the first ten places were annexed by cars with engines capable of a maximum of about 3400 r.p.m. and all seven were of the four valves per cylinder type.

This year marked the withdrawal from racing of the Stutz factory and as many of the prominent manufacturers were engaged in war work few of them followed up the lessons learned.

#### The Sixth Race—1916

The race run off in 1916 was for 300 miles and only Maxwell and Premier were represented as factory entries.

Louis Chevrolet appeared on the scene but didn't do much this time.

The editor's impression of the 1916 race is set down in these few lines from MOTOR AGE of that year:

**INDIANAPOLIS, May 30, 1916.**—Constant plugging with practically no keen competition to face won first place and \$20,000 for Dario Resta in his battle-scarred Peugeot in the annual Memorial Day classic on the International Speedway today. His time for the 300 miles of 3 hours, 34 minutes, 15.71 seconds, an average speed of 83.26 miles per hour, did not approach the speed set in last year's race, but there was no DePalma to set his nerves on edge.

#### STATISTICS OF THE 1916 300-MILE RACE

Open to cars with a piston displacement of 300 cu. in. or under.

Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Piston Displace.	Time	M.P.H.
1 17	Peugeot, Resta	4	3.62	6.65	274	3:34:17	83.26
2 1	Duesenberg, D'Alene	4	3.75	6.75	299	3:36:15	83.15
3 10	Peugeot, Mulford	4	3.60	6.70	274	3:37:56	82.60
4 14	Sunbeam, Christiaens	6	3.18	5.90	299	3:46:36	79.96
5 15	Delage, Oldfield	4	3.72	6.30	275	3:47:19	79.20
6 4	Maxwell, Henderson	4	3.75	6.75	298	3:49:56	78.30
7 29	Premier, Wilcox	4	3.60	6.70	274	3:54:31	76.80
8 28	Crawford, Johnson	4	3.75	6.75	298	4:01:54	74.40
9 24	Crawford, Chandler	4	3.75	6.75	298	4:02:43	74.20
10 9	Osteweg, Halbe	4	4.34	5.00	296	4:03:10	74.00
11 12	Ogren, Alley	4	3.98	6.00	299	4:04:47	

Also started—8—Frontenac, L. Chevrolet, 80 laps; 28—Premier, Anderson, 75; 25—Crawford, Lewis, 71; 18—Peugeot, Aitken, 69; 21—Delage, DeVigne, 61; 27—Premier, Rooney, 48; 7—Frontenac, A. Chevrolet, 35; 19—Peugeot, Merz, 25; 5—Maxwell, Rickenbacker, 10; 23—Pusum, Franchi, 9.

This was an off year and although America had gained some ground in the task of regaining lost territory the showing was far from satisfactory.

Louis Chevrolet was working on the idea that he could go Peugeot one better. The materialization of this idea was manifested in the Frontenacs and Monroes, the progress of which is interesting to follow.

Fred Duesenberg was busy on an idea of his own but the urge of war work prevented its fulfillment.

Harry Miller at this time had been overhauling many famous foreign cars and was getting ready to be heard from later.

Then came the war and there was no activity until 1919.

#### The Race of 1919

In 1919 it was decided that such tremendous speeds as shown in previous races represented the maximum safe limit for the track. Public opinion was at work as a reactionary agent, not knowing that their eyes were not yet fully opened on the speed question—but read the MOTOR AGE account of the race:

**INDIANAPOLIS, May 31, 1919.**—

More noteworthy than the victory of Howard Wilcox driving a Speedway-owned Peugeot in the 500-mile Victory race at Indianapolis today, by which the International Sweepstakes honors were returned to America by a native driver, is the fact that future races on this track will be for CARS WITH SMALLER PISTON

it, its work is accomplished as far as those are concerned.

Just think of it—too fast for the track and think what happened in 1922.

When you study the above summary of the 1919 race you will see the unmistakable trend towards higher engine revolutions.

By this time America had brought the four-cylinder engine to a state of perfection equal to the Peugeot of 1916, but while we were spending time on the fours, Europe was building eights. M. Henry, who had designed the famous line of Peugeot fours, turned his hand to the building of something still faster. The Ballot straight eight of Rene Thomas's was H. Henry's ace. In the qualifying trials it was apparent that for pure speed the Ballot was head and shoulders above anything on the track. The Twin Six Packard of DePalma's was the American favorite.

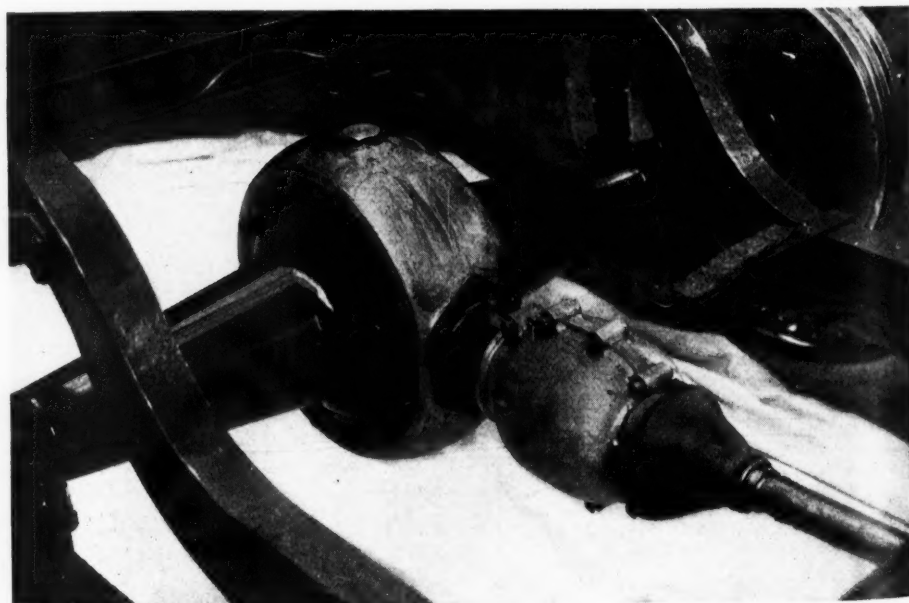
History shows that the race was an upset of all the dopesters' prophecies and the fastest car did not win. The unusual speed average made by the cars finishing in the first eight positions gives an index of the evolution that had taken place since 1911.

Everything was cord tires, and battery ignition was being used on some cars. The engine revolutions had been stepped up to 3800 per minute. There were rumors about multiple carbureters and every engineer in the crowd went home thinking about the smooth-running, eight-in-line Ballot.

#### The Race of 1920

Living up to the decision announced the year before the piston displacement limit for 1920 was 183 cubic inches. Apparently everyone was surprised at the speed average made by the small engines. The opening paragraph of the race story follows:

**INDIANAPOLIS, May 31, 1920.**—



Aluminum alloy differential housings of the style of the above are the rule rather than the exception



Fig. 1—The Mercedes employing an overhead camshaft with rocker arms. Used on 1914 models similar to 1915 Indianapolis race winner

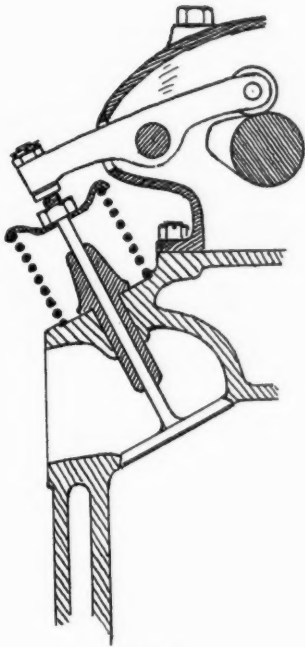


Fig. 1

Fig. 2—Early Peugeot overhead mechanism. Like the Mercedes of 1914, this engine carried four valves per cylinder. Design was later changed to something similar to Fig. 6

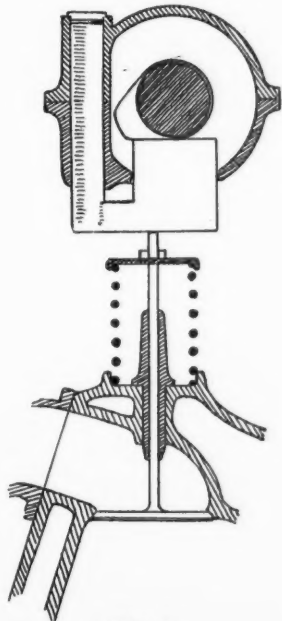


Fig. 2

Fig. 3—A type of Delage valve mechanism using two crankcase camshafts. The early model Duesenbergs used horizontal valves but were fitted with longer rocker arms and overhead camshaft

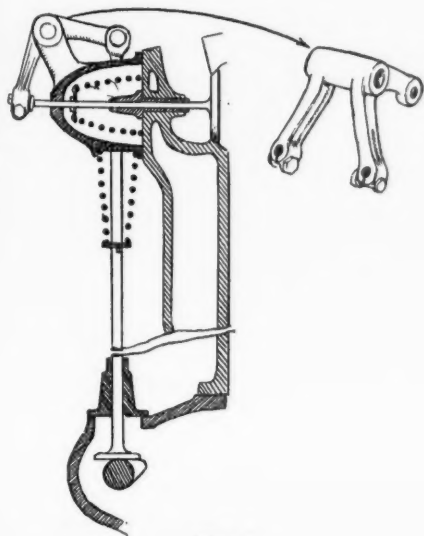


Fig. 3

Fig. 4—Valve action as used on Duesenberg 1922 models. An overhead camshaft with bell crank type lifter mounted above characterized the straight eight engines of that make. Vertical shaft drive was used for the camshaft

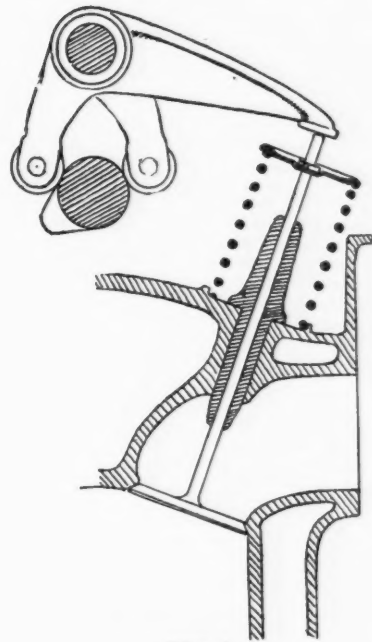


Fig. 4

Fig. 5—Hispano Suiza type of valve action used on Mercedes last year and may be used on Barber Warnock Fords this year. With this construction the thrust of the cam is taken by the valve guide. Modifications of this system consist in threading the outside instead of inside of valve stem

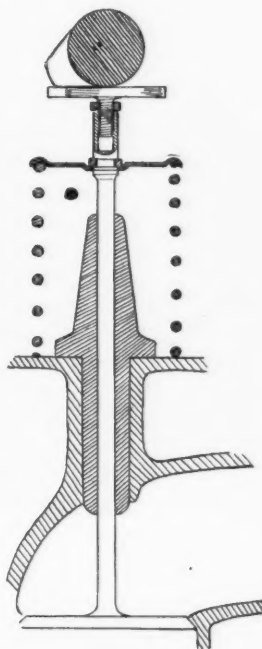


Fig. 5

Fig. 6—Later type of Peugeot and also at one time used by Louis Chevrolet will be seen on some styles of special Ford head outfits. Early types using this principle had the valve springs and intermediate lifter open, but on late models the entire mechanism was enclosed by housing as shown in dotted lines

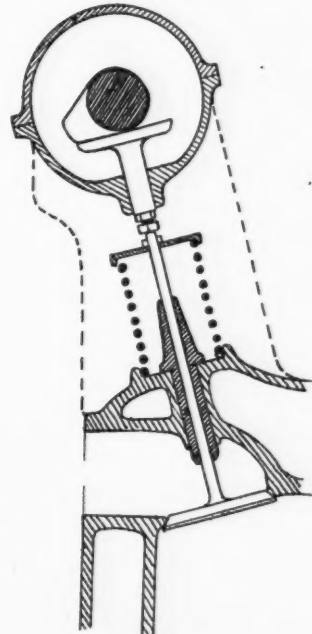


Fig. 6

Fig. 7—This construction has been used by Harry Miller for the past 2½ years. It was used last year by Duesenberg and Packard. The side thrust of cam is taken through the thin walled cup, and transmitted to aluminum cup housing which runs full length of block assembly

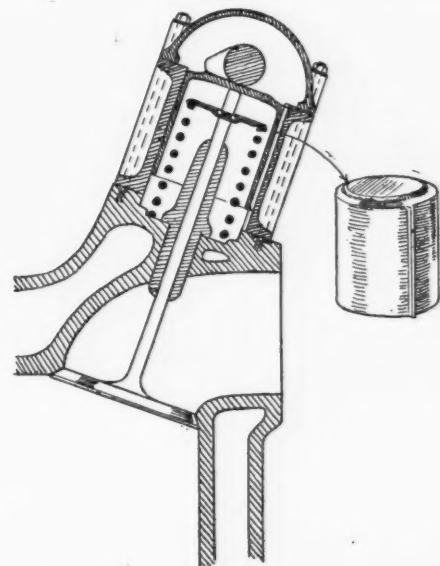


Fig. 7

## STATISTICS OF THE 1919 500-MILE RACE

Open to cars with a piston displacement of 300 cu. in. or under.

Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Piston Displace.	Time	M.P.H.
1 3	Peugeot, Wilcox	4	3.60	6.70	274.6	5:40:42.87	88.06
2 14	Durant, Hearne	4	3.81	6.50	298.6	5:44:29.04	87.10
3 6	Peugeot, Goux	4	3.60	6.70	274.6	5:49:06.18	85.94
4 32	Ballot, Guyot	8	2.92	5.52	296.0	5:55:16.27	84.44
5 26	Bender, Alley	4	3.625	7.00	289.0	6:05:03.92	82.18
6 4	Packard, R. DePalma	12	2.657	4.50	299.2	6:10:10.64	81.03
7 7	Frontenac, L. Chevrolet	4	3.875	6.375	299.5	6:10:10.92	81.04
8 27	Hudson, I. Vail	6	3.500	5.00	288.6	6:12:42.00	80.54
9 21	Stickel, Hickey	6	3.500	5.00	288.6	6:13:57.24	80.20
10 41	Frontenac, G. Chevrolet	4	3.875	6.375	299.5	6:17:21.79	79.50
11 31	Ballot, Thomas	8	2.92	5.52	296.0	6:21:10.92	78.70
12 8	Stutz, Cooper	4	3.81	6.50	298.0	6:21:35.05	78.65
13 23	Shannon, Shannon	4	3.75	6.75	298.2	6:30:50.75	76.75
14 17	Hudson, Haibe	6	3.50	5.00	288.6	6:34:28.09	76.06

Also started—Baby Peugeot, Boillot, 195 laps; Peugeot, Howard, 130; Deussenberg, D'Alene, 120; Roamer, LeCocq, 90; Peugeot, Klein, 70; Detroit, Kirkpatrick, 69; Deussenberg, O'Donnell, 60; Ballot, Bablot, 57; Deussenberg, Milton, 50; Roamer, Hitke, 48; Chevrolet, Durant, 46; Ballot, Wagner, 40; Thurman, Thurman, 39; Toft, Toft, 37; Frontenac, Boyer, 30; Frontenac, Mulford, 28; McCoy, McCoy, 27; Richards, Brown, 12; Oldfield, Sarles, 8.

The light weight racing car made good here today. It went through 500 miles of extreme speed in a way which astounded even the most en-

thusiastic adherents of the light car idea. Gaston Chevrolet, driving an American-built Monroe car, won the race at a rate of 88.16 miles per hour.

## STATISTICS OF THE 1920 500-MILE RACE

Open to cars with a piston displacement of 183 cubic inches or under.

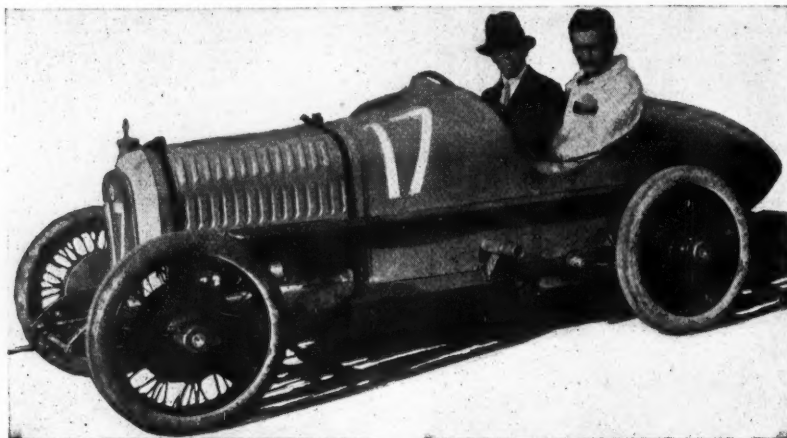
Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Piston Displace.	Time	M.P.H.
1 4	Monroe, Gaston Chevrolet	4	3.125	5.9375	182.5	5:38:32.00	88.50
2 25	Ballot, Rene Thomas	8	2.56	4.41	181.0	5:44:51.60	86.90
3 10	Duesenberg, Tommy Milton	8	2.5	4.625	181.5	5:45:02.48	86.80
4 12	Duesenberg, Jimmy Murphy	8	2.5	4.625	181.5	5:52:31.35	85.60
5 2	Ballot, Ralph DePalma	8	2.56	4.41	181.0	6:05:19.15	83.30
6 31	Duesenberg, Eddie Hearne	8	2.5	4.625	181.5	6:10:21.55	81.0
7 26	Ballot, Jean Cassagne	8	2.56	4.41	181.0	6:15:16.65	80.25
8 28	Monroe, Joe Thomas	4	3.125	5.9375	182.5	6:21:41.55	78.50
9 33	Mulford, Ralph Mulford	8	2.5	4.625	181.5	7:17:14.25	68.50
10 15	Revere, Henderson-Alley	4	2.5	4.625	181.5	7:23:53.95	67.50

Also started—Richards Special, John Boling, 199 laps; Frontenac, Joe Boyer, 192; Peugeot, Ray Howard, 150; Duesenberg, Eddie O'Donnell, 149; Peugeot, Jules Goux, 148; Meteor, Willie Haupt, 146; Frontenac, Bennie Hill, 115; Monroe, Louis Chevrolet, 94; Peugeot, Howard Wilcox, 65; Monroe, Roscoe Sarles, 58; Frontenac, Art Klein, 40; Gregoire, Jean Porporato, 23; Peugeot, Andre Boillot, 16.

Entered but failed to qualify for race—Chevrolet Special, R. C. Durant; Oldfield Special, Waldo Stein; Gregoire, Jack Scales; Philbrin Special, Ira Vail; Ellingboe Special, Jules Ellingboe; Ellingboe Special, C. Glenn Howard; Kenworthy, Kurt Hitke; T. N. T., Frank Elliott; Revere, Tom Rooney.

Louis Chevrolet's idea had triumphed and his own brother came home the winner on a car designed and built by Louis. The year 1920 might be called the last year of the fours for racing because even though the Monroe had distinguished itself, Chevrolet went back to his shop after the race and set to work on the design of a straight eight.

Technically 1920 marked the almost universal use of ball and roller bearing for one or more of the crankshaft journals. There were several engines with multiple carburetors and all used the scavenger pump in the oil circulating system. Fred Duesenberg had finished his first set of straight eights and their performance was gratifying. Harry Mil-



The 91-in. Talbot with two aboard—a striking contrast to the monster Marmon Wasp of 1911 shown on page 21

ler as yet had not entered competition with his idea of an eight cylinder racing engine.

There was considerable variation in the design of valve actuating mechanism, but Ballot used a modified Hispano Suiza layout and the Frontenacs also. All other engines used some form of rocker arm mechanism. Considering that this was the first year of the 183's the speed average indicates that the basic ideas of light weight, reciprocating parts, high compression and high crankshaft speeds were being applied with a satisfactory degree of success.

The engines of 1920 on an average were capable of about 4000 revolutions per minute. The performance of the Ballot this year added another feather in the cap of the eight-cylinder enthusiasts.

## The Race of 1921

The year 1921 wrote the name of the eight cylinder in line engine as an era in the evolution from the days of the Wasp. Of nine cars that placed, eight of them were of the straight eight variety. The story:

## INDIANAPOLIS, May 30, 1921.—

An American car, the Frontenac, piloted by an American, Tommy Milton, won the ninth annual 500-mile Indianapolis race here this afternoon in 5 hours, 34 minutes, 44.65 seconds, an average speed of 89.62 miles per hour.

Note that in the above opening paragraph no mention was made of "unheard of speed," "too fast for the track," etc. It appears that opinion had grown to expect greater speed as the engine size was reduced. Evolution of opinion was keeping pace with evolution of race car design.

The four is on the decline as a racing car and engines were turning around 4400 r. p. m. Nearly every engine was equipped with battery ignition, the distributor rotors of which were carefully balanced.

Harry Miller was represented with his first straight eight, the Leach Special, and nearly all the Americans were using his carburetors.

Everyone except Duesenberg was using a direct acting valve opening mechanism. Note that seven cars averaged better than 80 miles per hour and also that only 9 cars were running at the finish.

Public opinion had come to regard 85 miles per hour as nothing unusual and when the 1922 race was finished the reporter covering the race did not go into ecstasies of wonderment at the result.

## The Race of 1922

The race of 1922 must have given the "most enthusiastic of the race fans" something akin to the well known jolt. The MOTOR AGE story began:

## INDIANAPOLIS, May 30, 1922.—

Five cars broke the Indianapolis record established in 1915 by Ralph DePalma. The first eight cars were straight eights, and of the first ten, seven were Duesenbergs. Jimmy



Murphy, driving a vehicle called the **Murphy Special**, a combination Miller engine and Duesenberg frame,

romped home a popular victor. His average speed for the distance amounted to 94.48 miles per hour.

#### STATISTICS OF THE 1921 500-MILE RACE

Open to cars with a piston displacement of 183 cubic inches or under.

Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Displace.	Time	M.P.H.
1	2 Frontenac, Tommy Milton.....	8	2.625	4.093	182.5	5:34:44.65	89.62
2	6 Duesenberg, Roscoe Sarles.....	8	2.5	4.625	183.835	5:38:34.30	88.61
3	23 Frontenac, Percy Ford.....	4	3.125	5.937	182.12	5:52:50.30	85.03
4	5 Duesenberg, Eddie Miller.....	8	2.5	4.625	183.835	5:54:24.98	84.65
5	16 Sunbeam, Ora Haibe.....	8	2.56	4.415	181.36	5:55:58.20	84.00
6	9 Duesenberg, Albert Guyot.....	8	2.5	4.625	182.672	6:01:17.70	83.03
7	3 Leach Special, Ira Vail.....	8	2.687	4.00	181.48	6:14:17.47	80.15
8	21 Duesenberg, Bennie Hill.....	8	2.5	4.625	183.334	6:19:06.74	79.13
9	8 Frontenac, Ralph Mulford.....	8	2.625	4.093	182.552	6:20:08.64	*69.87

\* Flagged 177th lap, awarded 9th place; only car running.

Also started: Sunbeam, Rene Thomas, 144 laps; Frontenac, Tom Alley, 133; Ballot, Ralph DePalma, 112; Revere, Eddie Hearne, 111; Duesenberg, Jimmy Murphy, 107; Junior Special, R. J. Brett, 91; Frontenac, C. W. Van Ranst, 87; Duesenberg, Joe Boyer, 74; Peugeot, Jean Chassagne, 65; Frontenac, Jules Ellingboe, 49; Talbot-Wilcox, 22; Frontenac, entered but did not qualify; Durant-Duesenberg (withdrawn), Tommy Milton.

#### STATISTICS OF THE 1922 500-MILE RACE

Open to cars with a piston displacement of 183 cubic inches or under.

Pos. No.	Car and Driver	Cylinders	Bore	Stroke	Displace.	Time	M.P.M.
1	35 Murphy Special, James A. Murphy....	8	2.685	4.0	181.44	5:17:30.79	94.48
2	12 Duesenberg, Harry Hartz.....	8	2.508	4.5	181.9	5:20:44.39	93.53
3	15 Ballot, Eddie Hearne.....	8	2.56	4.218	180.1	5:22:26.06	93.04
4	17 Duesenberg, Ralph DePalma.....	8	2.531	4.5	181.15	5:31:04.65	90.61
5	31 Duesenberg, Ora F. Haibe.....	8	2.49	4.5781	177.14	5:31:13.45	90.58
6	24 Duesenberg, G. W. Wonderlich.....	8	2.503	4.5	181.68	5:37:52.84	88.79
7	21 Duesenberg, I. P. Fetterman.....	8	2.49	4.625	180.2	5:40:55.54	87.99
8	1 Distel-Duesenberg, Ira Vail.....	8	2.501	4.656	183.33	5:48:19.16	86.15
9	26 Monroe, Tom Alley.....	4	3.125	5.9375	181.54	5:55:53.46	84.20
10	10 Duesenberg, Joe Thomas.....	8	2.507	4.5	181.28	6:03:24.23	82.50
11	3 Frontenac, E. G. Baker.....	8	2.628	4.25	183.04	6:18:28.40	79.25
12	34 Durant Special, R. Clifford Durant....	8	2.685	4.0	181.44	6:25:33.92	77.75
13	22 Bentley, W. Douglas Hawkes.....	4	3.15	5.875	182.68	6:40:25.55	74.95

Also started: Franty-Ford, Homer Ormsby, 165 laps (flagged); Monroe, Wilbur D'Alene, 160 (flagged); Leach Special, Frank Elliott, 195; Monroe, Lora L. Corum, 169; Franty-Ford, C. Glenn Howard, 163; Frontenac, Ralph Mulford, 161; Frontenac, Peter DePaolo, 110; Frontenac, Art Klein, 105; Frontenac, Leon Duray, 94; Frontenac, Roscoe Sarles, 88; Leach Special, Tommy Milton, 44; Ballot, Jules Goux, 25; Duesenberg, Jules Ellingboe, 25; Peugeot, Howard Wilcox, 7.

#### The 1923 Race

INDIANAPOLIS, May 1, 1923.—Official awards, Indianapolis 500-mile race:

Posi- tion	Car and Driver	No.	Time	Average M. P. H.
1	H. C. S., Tom Milton.....	1	5:29:50.17	90.95
2	Durant, Harry Hartz.....	7	5:33:05.00	90.06
3	Durant, Jim Murphy.....	5	5:40:36.64	88.08
4	Durant, Ed Hearne.....	6	5:46:14.23	86.65
5	Barber, Warnock L. Corum.....	23	6:03:16.81	82.58
6	Durant, Frank Elliot.....	31	6:04:52.37	82.22
7	Durant, Cliff Durant.....	8	6:05:06.30	82.17
8	Mercedes, Max Sailer.....	15	6:11:49.60	80.68
9	Bugatti, B. De Cystria.....	19	6:26:24.78	77.64
10	Duesenberg, W. D. Morton.....	34	6:40:04.98	74.98
11	Mercedes, C. Werner.....	16	6:41:50.51	74.65

The year 1922 was a cleanup for the straight eight. Technically the most apparent change in the cars as compared to the year previous was the use of a carburetor for each cylinder on the Miller jobs, the use of better valve steels, higher compression, reduction of friction in the power transmission units and elimination of the ignition engine driven generator.

All of the Duesenbergs in the Indianapolis race of that year used rocker arm overhead camshaft valve actuation which was later changed to a direct acting system.

The best of the engines were turning up to about 4600 r. p. m. and the four-cylinder engine appeared to be outclassed

as a racer.

The 1922 cars were not too fast for the track, but it was apparent that they closely approached the speed limitations of the curves and brick surfacing. To maintain the high average speed meant considerable discomfort for drivers, and it was decided to cut the limits to 122 cubic inches for 1923.

Hardened to an unusual speed average there was little surprise regarding the outcome of the 1923 race.

It was the first year for the 122's and many were the chassis changes made necessary to provide anything resembling stability and comfort for the drivers. The single seaters were in the main smaller editions of the successful

183 inch jobs of the previous year and their engines were capable of as much as 4900 revolutions per minute.

Technically the year marked the first supercharger to appear on an American track. Among the eight and six cylinder cars there was considerable uniformity of design and Packard, Duesenberg, Miller and Mercedes made use of the direct acting valve layout.

One of the Packards and all of the Bugatti cars used magneto ignition. The Scintilla on the Packard, a two-spark type, was turning 1½ times engine speed.

Besides the various engine improvements the car of 1923 was a far more efficient design as regards the chassis components. A very considerable reduction in overall weight had been one improvement. The various items of unsprung weight had been refined and this was the age of aluminum alloy differential housings. Rear axle assemblies were of the built up kind with all parts machined to the minimum thickness possible with safety. The ¾ floating axle was the predominating type of design. There was a decided trend towards the use of brakes only on the front wheels for service, and emergency on the drive-shaft or transmission.

Body designs were made from aircraft fuselage data. Not only was the frontal area of the cars reduced, but the shapes behind the radiator were designed to allow the minimum amount of retarding eddy currents. Up to date not much attention had been given to streamlining the bottom of the chassis. As the bottom of the car is really more important from a resistance viewpoint than the top it is expected that some of the cars for this year will be thoroughly enclosed on the roadbed side.

#### Stock Car Trends

The past few years have seen a decided trend towards the high speed engine even on the part of manufacturers making a high priced product. The straight eight idea has been transplanted to stock car production. Four wheel brakes are being used by manufacturers who are considered conservative. The alloy piston with narrow ring has enjoyed a widespread application on cars of both the high and medium speed engine type. Pressure lubrication is the rule rather than the exception. A better weight to power ratio has been accomplished in all cars regardless of class during the past five years. All of these features either originated or were proved as sound in the laboratories of the race track.

#### Peugeot Still Leads as a Make

In conclusion it may be interesting to note that among the various makes that have competed at Indianapolis Peugeot ranks first, having won three races. The cars designed by Louis Chevrolet and Harry Miller are tied for second place, as each has won twice.

Will Harry Miller equal the Peugeot record or will Fred Duesenberg, the capable designer, produce a winner this year?

# MOTOR AGE'S PICTURE PAGES



American "Wanderwells" in Constantinople. The Wanderwell tourists, on a globe trot in a Ford, arrive at St. Sophia, Constantinople. We always wondered if we could spell that name on a typewriter



Cal's campaign managers use this license plate stunt out in California. Now, if some guy doesn't think it's a complimentary tag furnished by the President, everything'll be jake



They do it here, too. "Quit your kidding," the press agent says Louise Fazenda says to Rin-Tin-Tin, famous movie dog. But Rin-Tin-Tin insists that he can have his Cleveland Six if he wants it, and that, the p. a. says, is a dog's life



Driving a Studebaker Special Six across Australia, a distance of 2889 miles, in five days, 21 hours and 45 minutes, is the accomplishment of John Burton, shown here



# OF AUTOMOTIVE INTEREST



Cannonball Baker's triumphal entry in Denver—brass band and the proverbial "everything" greeted the driver upon his return east after piloting the Gardner sedan across the continent



"The Open Road Calls the Swagger New Buick"—all right—what does it call it?



Buick and Buster Keaton get together in a little deceptive work, designed to fool even the most expert eye (except the caption writer's) who can very plainly see that it is only a raft with a Buick radiator on it



Fageol supplies these new busses recently put into service by the Los Angeles Motor Bus Co.





Vol. XLV

Thursday, May 29, 1924

No. 22

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## Plenty of Room for Roads

PERSONS who have to do with the building of highways should right now revise all their old ideas about the adequate width of the driving track. No one would think of building a single track road where there is any traffic of consequence to be carried, and yet many of our roads that are being constructed today are not much better than one with a single track.

The road that is only wide enough for two streams of traffic—one each way—is not much better than the single track road, for under the conditions prevailing near all cities of any size such a road limits speed to that of the slowest vehicles. A horse and buggy or a heavily loaded truck will hold up traffic for miles because the constant stream of traffic going the other way prevents the faster vehicles passing without subjecting themselves to danger.

Such conditions as these are found not merely on the outskirts of large cities, but often far into the country and nearly always near the many thriving small cities that dot the plains and valleys.

The condition, of course, is more pronounced on Sundays, for that is the great motoring day for American peo-

ple. It may seem economically foolish to build highways to accommodate a load that they are called upon to meet only one day a week. The fact is, however, that people buy automobiles to drive and it happens that the peak of driving comes on one day a week. If roads are so limited in width that a slow vehicle or an accident will bar traffic for hours the whole utility of the motor vehicle is lost so far as that road at that time is concerned.

Fortunately most of the highways that have been laid out in this country have a right of way wide enough to accommodate all the traffic they are likely to be called upon to carry. In most cases, however, the greater part of the right of way is occupied by ditches and impassable barriers. The crowned center provides the driving track and where roads have been surfaced this driving track is seldom more than wide enough for two streams of traffic.

In Cook County, Illinois, where traffic is unusually congested, the authorities have decided to widen all concrete roads to a width of 36 feet. These wide tracks will replace 18-foot tracks which have been found inadequate because they limited the moving load to two opposing streams of vehicles.

It is, of course, expensive to build such wide roads, but the time is fast approaching when they will be absolutely necessary and demanded by the people who pay taxes to own and operate automobiles. It is for that reason that from now on all highway propaganda and activities should be directed toward the building of wider roads.

It is possible that in localities where the traffic does not justify the great expenditure required for the building of 24- or 36-foot roads some expedient might be devised at lower cost that would free the traffic of the restraint that slow-moving vehicles put upon it. This might be done by building turn-outs, or wide places in the road, at intervals of every few miles. Such places would permit the dammed-up stream behind a truck or team of horses to get ahead without risk. Such wide places should be permanently constructed so that later they might be incorporated into a general widening of the highway when conditions warrant.

## Speeding and Other Things

NEWSPAPERS, motor clubs, trade associations, schools, churches and a hundred other forces have come to the front recently, with pleas for saner driving. These campaigns have doubtless done worlds of good in eliminating the reckless driver, or at least in taming him. Still the death rate continues to mount daily. Cars crash, people are hurt and no one seems to know just how or why. Dealers lately have put a wail that sales are meeting a greater obstacle in the possibility of accident than at any other source.

This would be quite natural. At the present time, the Chicago Automobile Trade Association is well along with a most commendable campaign for better driving conditions and better drivers. They are doing a lot of good with the car owner who sees in his car a means of recreation and pleasure.



There is another accident cause which should be looked into by the dealer—it is the dealer's own fault that it exists and a word from him will stop it. It is the speeding service truck. There is no more necessity for a service truck speeding like a wild thing than there is for an Alaskan ambassador at Borneo.

The speed vehicle, be it service truck or anything else, is a challenge for speed. Certainly, if these things are allowed to rattle over a road at fifty miles an hour, anything is. Make the driver of your service truck respect the law—start in your own backyard and when you've finished that—go to your neighbor.

### The World at Our Door

**A**UTOMOTIVELY speaking the whole world is at our door seeking admittance. It is pleading for our secret of economical motor transportation and there is reason to believe that sooner or later the world will awaken to the simple fundamental that individual transportation as represented by the motor vehicle is a useful service and not a luxury. When the world recognizes this truth it will have discovered the secret which we have been trying for years to tell it.

Congregating in Detroit last week representatives from many nations talked of the marvels of motor transportation in America and related the difficulties that beset the introduction of motor vehicles in any great number in other continents. And the story of their backwardness is largely one of exorbitant taxation. That and the lack of good roads.

Motor car taxes and fees that are complained of in the United States are insignificant beside the exactions of some of the European and Asiatic countries. Two hundred dollars or more for the privilege of owning a Ford is commonly assessed in some of these countries. In addition, there is a high price for gasoline, due principally also to taxes of one kind or another. These taxes are frankly imposed on the theory that the motor vehicle is a luxury.

When there arise statesmen in Europe who realize the wonderful significance of motor vehicles not only as carriers of commerce but as disseminators of good will and the spirit of peace there will be a more beneficent official attitude toward the automobile and an era of progress will be inaugurated. There are signs that this time is approaching. It will mean a great deal to America as the outstanding leader in the production, sale and use of motor vehicles.

### Maintenance Makes Good

**T**HE equipment show at Detroit last week was convincing proof of the importance of maintenance in the automotive industry. The exhibits were mostly machines for the speedy and accurate repair of motor vehicles and men from all ranks in the trade came to look.

In the crowds that thronged the show were factory service managers, branch service managers, distributors' service managers, proprietors of shops and mechanics who

are eager to do better work. Every one in any of these classes undoubtedly got some benefit from the exhibition of so many tools and machines in one place and in actual operation. The experienced mechanic and the service manager who has a fundamental knowledge of what his job was about were able to tell almost at a glance what tools were useful and what were not.

The important thing, however, is to make use of the knowledge gained in a way that will materially help the industry. This can be done by applying this knowledge to a more satisfactory and accurate servicing of motor vehicles at lower cost. When owners of motor vehicles are made to feel confident that they can obtain a dependable overhaul or repair job at a reasonable price there will be a great deal more work for the maintenance shops.

If the Detroit show has helped to point the way to better maintenance service at lower cost it certainly has been worth while and should be repeated at least once a year.

### A Necessary Movement

**C**OORDINATION of the numerous movements aimed at traffic hazards will be undertaken by a committee of industrial leaders recently appointed by Secretary Hoover. In selecting C. F. Kettering of the General Motors Research Corp., Dayton, to represent the automotive industry in the central supervisory organization and serve as automotive chairman we believe Mr. Hoover made a wise choice. Mr. Kettering is well qualified to perform in this capacity.

Each of the other four chairmen is highly identified with his profession or pursuit. Mr. Hoover's chairmanships are filled by high-calibered men. The secretary evidently believes in the policy of getting big men for the task that you want done well.

Coordination of traffic movements in this country is an important and necessary thing. There are countless organizations—national, state and local—working to the same end and for a fine purpose but at the same time, on the whole, working without system or true direction. Repeatedly we read where one or another association has adopted resolutions on this subject. Attempting to cure traffic ills by resolutions, that most times effect no cure at all, has become a regular thing. And the chronic failure is not because the resolutions are without merit. Often they are sane enough. Early in May the National Association of Railroad and Utilities Commissioners urged some very sensible measures in the interest of highway safety but with all this society's prestige and influence the effect of its action in a large measure was only to "adopt resolutions."

There has been need for a central organization, the purpose of which would be to harness the good suggestions for traffic safety and see to a coordination of working forces. The campaign for safety has been too much without a recognized head and consequently there has been too much wasted energy and lost motion. We believe Mr. Hoover is on the right track. He should be given the public's full and hearty support in this effort.

# Several Lines to Raise Prices June 1

## Upward Revision Applies To Units Around \$1,500 Class

Makers of Cheaper Models Are Not Anticipating Schedules Calling For Advances

### BULLETIN

DETROIT, May 26.—Prices on Chevrolet open models and on the commercial chassis have been increased, effective at once, the new prices ranging from \$5 to \$15. The new price on the chassis is \$410, \$15 higher. No change is made in the price of closed models. Other changes made are shown by the following table:

Model	Old Price	New Price
Roadster .....	\$490	\$495
Touring .....	495	510
De Luxe Touring.....	625	640

The increases are declared due to increased costs.

DETROIT, May 26.—Prices will be increased in several lines of cars the first of June, according to confidential information from executives of companies which are planning increases. These statements are made without thought of their possible effect upon business during the present month, and are not being circulated for this purpose. They are indicative of rearrangement of production schedules with new prices based upon these lower totals.

As indicated earlier, the changes will be in lines approximating the \$1,500 class. Changes may be made in some of the lower priced lines, but there are no indications of this now. Manufacturers in low priced lines are not anticipating reductions of schedules to points making higher prices necessary. One low priced maker has declared that higher prices would have serious effect on buying and therefore are not to be considered.

### Reluctant With Plans

There is still opinion in the industry that better weather will witness a large increase in the volume of business. Executives generally are unwilling to concede that business is slowed down indefinitely and for that reason are hesitating about making any plans for the balance of the year. If the appearance of good weather fails to develop an improvement in general market conditions than makers will make definite plans.

What manufacturers are looking for more than anything else is an improvement in the used car situation. Good weather alone will get used cars going in the quantity necessary for satisfactory movement of new cars, and in the absence of this there is much question as to what will develop. There is no question but that dealers are heavy on used cars and a large part of the new cars

## Slogan Wanted for A. E. A Campaign

CHICAGO, May 26.—The Automotive Equipment Association wants a slogan for its Profitable Maintenance campaign. Members of the trade are asked to submit suggestions.

The slogan desired should be short, snappy, easy to read, easy to say and dignified.

It should suggest to every motorist the value of having his car kept in repair by a reliable dealer using dependable parts.

Suggestions should be sent to Arthur R. Mogge, merchandising director of the A. E. A., City Hall Square Building, Chicago.

business that is being done is on a clean deal basis only.

In the meanwhile manufacturers are giving dealers all possible support in moving their stocks of new cars. The reduced factory schedules are the most important evidence of this, but in addition merchandising plans are being put over from factories solely with the thought of getting dealers out of difficulties occasioned by stored cars. One manufacturer has advanced a large part of the advertising appropriation over from the latter part of the year to help move cars now. Other manufacturers are undoubtedly making similar changes in their advertising plans.

## Franklin Factory Is Closed Temporarily for Inventory

SYRACUSE, N. Y., May 26.—Official announcement is made by the H. H. Franklin Manufacturing Co. that the factory here has closed for the annual inventory period. The plant has been operating only three days a week and recently laid off a large number of employees. The suspension is only temporary, it is said. The company's statement follows:

The Franklin company is embracing the opportunity afforded by the present lull in automobile manufacture to take the inventory which would ordinarily have been taken last December, but which was then passed up in order not to interfere with the heavy production to provide a large reserve for spring. Ordinarily with full force, this is a job covering a period of at least two weeks. Under present conditions it will take considerably longer."

## Retail Situation of Past Six Weeks Is Described as Spotty

Demand in April and May on Whole Compares Favorably With Year Ago

NEW YORK, May 26.—Weighing the evidence as it comes from factories and shipping reports, May production of automobiles will more closely approach that of last January rather than maintain the record pace which has marked the activities of the manufacturers in the earlier months. On the face of returns, it would look as if final count for the present month will show a drop of between 12 and 15 per cent in comparison with April's 373,139 cars and trucks.

January, with 316,152, was the last of three months of the breathing spell the industry took following the whirlwind months of August, September and October, brought about by the introduction of so many new models, when 1,037,940 cars and trucks were put on the market. Feeling the pulse of the public at the national shows and anticipating a big spring demand, which apparently did not materialize, the manufacturers tested the capacities of their plants in February, March and April, with the result that production caught and passed demand.

### Expect Buying Streak

The belated spring apparently has come and with its advent, makers and dealers now look for a verification of their judgment in making and storing cars to meet the good business which their horoscope predicted last fall when plans for the year were made out. Given good weather, it is expected that a buying streak will put on the road the new cars that should have been running six weeks back.

"Spotty" is the word that best describes the retail situation of the past six weeks. On the whole, demand in April and May compares most favorably with the same time last year when both production and buying records were broken. While the majority doubtless experienced a mild sort of slump, there were instances reported of well known makes which have sold in larger numbers than in April and May, 1923. Those that did feel the slowdown have not been discouraged, though, for business done by them can be classed as excellent, all things, including weather and Washington, considered. From now on, for the next month at least retail sales should be brisk.

The storm signal set two weeks ago by the head of the largest group of producers who followed his prediction of higher prices by advancing the list on his most popular makes has been observed by other manufacturers and the buying public can prepare itself for adjustments of lists of a higher trend within the next month.



## Parts Association Is Formed By Manufacturers and Jobbers

### Executive Committee Appointed at Convention to Work Out Details of Organization

DETROIT, May 26.—Formation of the National Standard Parts Association was accomplished here Saturday at an organization meeting attended by 113 manufacturers and jobbers. Prior to formal launching of the association, which is set for the first week of November in Chicago, an executive committee, named at the organization meeting, will function in enrolling members and in drafting the constitution and by-laws.

By action of the organization meeting, membership in the association is restricted to manufacturers of standard replacement parts and jobbers specializing in wholesaling new parts. Applications for membership at the inaugural meeting totaled 65, about 37 of which were from prospective jobber members and 28 from manufacturers. Expense of organization was fixed at about \$10,000, which will be raised for the most part from initiation fees.

A. T. Haugh, vice-president of the King Sewing Machine Co., Buffalo, was elected chairman of the executive committee, which is composed of three manufacturer and four jobber members. The other members are C. W. Moffett, Warren Gear Products Co., Warren, Pa.; F. C. Kip, Milwaukee Die Casting Co., Milwaukee; R. M. Schure, Southern Bearing Co., Atlanta; O. J. Petersen, P-D Auto Parts, Inc., Hartford, Conn.; W. T. Mills, Auto Parts Co., St. Louis, and C. H. Shuptrine, Shuptrine Parts Service, Cedar Rapids, Iowa.

### Chicago Headquarters

The executive committee was selected so far as possible from men living close enough to Chicago to permit of meetings at least once monthly in Chicago so work of preparing for final organization may proceed rapidly. It is planned to make Chicago the permanent headquarters of the association. An organizing secretary will be named at office.

The organization meeting was presided over by W. D. Patterson of Patterson Parts, Inc., San Francisco, a prime mover in getting the association plan underway, and who with Mr. Moffett and Fred P. Howard of the W. D. Foreman Co., composed the purpose committee. Mr. Moffett was vice-chairman and S. D. Callaway, Turner Manufacturing Co., Kansas City, Mo., secretary.

General outlines of the membership provisions and the purpose of the association as set forth by the purpose committee were accepted with little change, resulting in the meeting being carried forward rapidly and giving time for adjournment for a dinner at night. The executive committee met Sunday to select regional committees and to outline other activities. Discussion at the organization meeting centered itself prin-

cipally upon qualifications for membership. These were set forth as follows:

### Membership Qualifications

Jobber memberships are open to those whose principal business is wholesale; whose business further is principally new parts, and to accessory jobbers who segregate their parts departments and handle them through a parts manager. Manufacturer memberships are open to those who manufacture and sell standard brand parts for wholesale distribution.

The objects of the association were set forth as follows: The betterment and development of the parts industry. The development of effective standards to which parts should conform. To affect a close contact between the manufacturer and jobber through which information of general interest may be transmitted. To establish a bureau of general information to include: A catalogue department; credit and collection department. To conduct a field survey of trade possibilities and distribution needs. To educate the public and trade as to distinct advantages of standard parts.

The establishment of a yearly trade show and convention at some central point at which merchandise may be shown was discussed.

### Sub-Committee on Balloons Named at Detroit Meeting

DETROIT, May 26.—Appointment of a sub-committee to study further the practical possibilities of balloon tire standardization resulted from the meeting of 40 representatives of the N. A. C. C., the S. A. E. and the Rubber Association of America at the Detroit Athletic Club recently.

The session was called to get a full exchange of views regarding the balloon tire situation from everyone concerned. When this objective had been accomplished the chief avenue open for constructive future action appeared to be in further standardization. It developed at the meeting that tire companies now are producing balloon tires in sufficient quantities to provide all that are required for original equipment so that the shortage which existed a few months ago no longer is present. It is generally agreed that a number of engineering problems still remain to be worked out in connection with the low pressure tire.

### SPRING CONCERN BANKRUPT

BUFFALO, N. Y., May 26.—A voluntary petition in bankruptcy has been filed by the Frontier Spring Corp., manufacturers of automobile springs at 378 Oak street, this city. Liabilities are listed at \$64,497 and its assets at \$5,085.

### COMMITTEE RECONSIDERS

WASHINGTON, May 26.—Henry Ford's bid for Muscle Shoals was rejected Wednesday afternoon, May 21, by the Senate Agriculture Committee in executive session, 10 to 6. Later, the committee agreed to reconsider the bill.

## East Canadian A. E. A. Group Returns to Original Basis

### Organic Complications Smoothed Out at Conference in Toronto With Webster and Board

CHICAGO, May 26.—As a result of a conference held at King Edward Hotel, Toronto, on May 22 a number of bothersome organic complications have been ironed out for Canada's eastern division of the Automotive Equipment Association, and the trade group of that section has been brought into more effective affiliation with the parent body, which has its headquarters in Chicago.

In the past few years the eastern Canadian organization has been a rather mystifying instrument to the A. E. A. with some of its members affiliates of the A. E. A. and others not. Hereafter, though, like the strong batting Prairie Division of the West, it is now said the Eastern Auxiliary will function harmoniously as a 100 per cent unit of the A. E. A.

Some 35 to 38 manufacturers and jobbers attended the Toronto meeting, including Americans with plants in the Dominion, and before the curtain fell every attending Canadian tradesman had joined the Automotive Equipment Association. The meeting, more importantly, was a preliminary step of thorough reorganization of the Dominion's eastern association on an A. E. A. basis. At present C. G. Keyes of the Keyes Supply Co., Ltd., Ottawa, is president of the association.

### Back to Original Plan

Through its reorganization the Eastern Canadian Division returns to the basis upon which, at the instance of William M. Webster, A. E. A. commissioner, it operated originally. The original society was formed in 1916, being known as the Canadian Auxiliary of the Automotive Equipment Association. Later the name was changed to the Canadian Automotive Equipment Association and there were complications and confusion.

In arranging for the conference May 22 with Mr. Webster and members of the A. E. A. board of governors, leaders in the eastern Canadian group indicated appreciation of the value of close relations with the Automotive Equipment Association, one of the world's strongest automotive organizations. Mr. Webster and the governors went to Toronto from the Detroit convention and the fact that an understanding was reached in one day is a suggestion of the complete harmony that prevailed.

### CURTISS WILL MOVE

BUFFALO, N. Y., May 26.—C. R. Keys, manager of the Kail street factory of the Curtiss Airplane & Motors Co. of this city, has confirmed a report that the main plant of the Curtiss company in Garden City, L. I., will be moved to Buffalo.

## Illinois Sales in April Gain 92 Per Cent Over March Total

### Indiana Retail 25 Per Cent Better Despite Loss for High Priced Lines

CHICAGO, May 22.—Illinois sales of new passenger cars for April, as revealed by registration statistics, registered a very marked advance as compared with the preceding month, with a gain of 92 per cent. All classes advanced materially, but the increase was especially noteworthy in the case of Fords and low priced cars excluding Fords, which increased 114 and 100 per cent, respectively.

Indiana did not keep pace with her sister state and showed a gain of only 25 per cent. All classes gained with the exception of high priced cars, which lost 7 per cent as compared with March.

The following table indicates the changes as compared with March:

Illinois		Gain
Fords	.....	114%
Low, excluding Fords	.....	100%
Medium	.....	61%
High	.....	39%
Total	.....	92%
Indiana		Gain
Fords	.....	21%
Low, excluding Fords	.....	34%
Medium	.....	24%
High	.....	Loss 7%
Total	.....	25%

Following are the detailed figures:

Illinois						
Low						
Month	Fords	Excl.	Med.	High	Price	Total
Jan.	4,101	2,187	5,871	1,013	13,172	
Feb.	3,201	1,724	3,762	567	9,254	
Mar.	5,798	2,396	4,761	690	13,629	
Apr.	12,461	4,805	8,073	964	26,303	
Total	25,561	11,112	22,467	3,234	62,358	
Indiana						
Low						
Month	Fords	Excl.	Med.	High	Price	Total
Jan.	4,106	1,007	1,259	104	6,476	
Feb.	4,748	1,353	1,743	121	7,965	
Mar.	6,664	2,054	2,688	215	11,621	
Apr.	8,126	2,760	3,449	198	14,533	
Total	23,644	7,174	9,139	638	40,595	

Illinois statistics were compiled from data furnished to MOTOR AGE by Robinson's Advertising Service, Springfield, Ill.; figures for the Indiana statistics were supplied by Indianapolis Auto Trade Association, Indianapolis, Ind.

### DEALER ENDS LIFE

ATLANTA, Ga., May 26.—W. A. McCollough, president of the W. A. McCollough Paige Co., Atlanta, and for many years one of the prominent automotive dealers in the southern field, committed suicide at his home here by shooting. Worried over business matters is said to have caused McCollough's act.

### WOULD TABOO STREET SALES

OAKLAND, Cal., May 26.—Establishment of used car sales yards on the main streets of Oakland is prohibited in an ordinance recently introduced.

### STEARNS DENIES REPORT

CLEVELAND, May 26.—The F. B. Stearns Motor Co. denied that the price of its four-cylinder cars will be reduced.

The company announced that on June 7 it would place on the market a complete new line of light six-cylinder cars that will sell for approximately \$1800 to \$2400. The present line of six-cylinder cars that sells for larger prices will be continued, as will the present line of four-cylinder cars.

## Chicago Garage Owners Get Set for Progressive Program

CHICAGO, May 26.—The Chicago Garage Owners' Association at a luncheon meeting on the evening of May 20 got "set" for an elaborate program of progress and development. The members gathered largely for an evening of entertainment but leaders of the organization declared that the event really marked an important stage of association accomplishment.

Robert Bland, business manager of the association, opened the program with a review of the organization's accomplishments and with a picture of some of the things the administration has in mind for the near future. In view of the program contemplated, Mr. Bland said he felt justified in predicting that this will be the most substantial year in the organization's history. Incidentally he reminded the garagemen that they should all follow the cash basis plan and make a close study of costs. The credit system, he asserted, has been a source of heavy losses for the garagemen of this state and especially of Chicago. "Depart from the cash basis, and you are playing with fire," he told his audience.

The association heard other practical and whimsical talks and saw "The Story of Gasoline," a new film released by the United States Bureau of Mines. The movie, which was prepared in co-operation with the Standard Oil Company, reveals the full process of producing gasoline from the petroleum field to final shipment to consumers or storage tanks.

## Electric Testing Motors of Greater Capacity Necessary

### Device of at Least One and Half H. P. Urged by Association Service Managers

DETROIT, May 26.—Declaring that the increasing use of motor buses with electric units of greater size and capacity meant that the authorized electrical service station would require a motor of greater capacity for testing equipment, the service managers of the Automotive Electric Association will advise makers of equipment that such motor should be at least one and one-half horsepower and of from 1,200 to 3,000 r.p.m. The average equipment is a one-horsepower and this is not sufficient to care for the bus units.

The service men met on Tuesday at the General Motors Building with a good attendance and completed the two-day program the first day. After discussion it was suggested that a tachometer of from 300 to 3,300 r.p.m. be used by the service station. The decision to advise the equipment maker of the recommendation was arrived at by the knowledge of service conditions of today and the trend of tomorrow, and so that the station taking on equipment would purchase economically.

After discussing the function of the service station relative to service and parts and accessories it was the unanimous opinion of the service men that service to the owner should come first, the trade second and that parts and accessories were a secondary consideration. The need of a greater effort on the part of the service station to sell service was emphasized. Considerable routine business relating to service was transacted and plans for future activities outlined. The service managers will convene in September when the Automotive Electric Association will meet at Eaglesmere Park, Pa., the second week in September. The meeting was presided over by Earl Turner, general manager of the association.

## "Wait—You May Lose!"—Warns Poster to Be Used for Crossing Campaign

WASHINGTON, May 26.—Judge C. C. McChord of the Interstate Commerce Commission presented prizes to the winners in the contest conducted by the American Railway Association for the most appropriate poster and slogan to be used in the campaign to reduce crossing accidents which begins on June 1 and continues until September 30. The winners follow:

Winner of the first prize of \$500 for the best poster and also the cash prize of \$100 for the most appropriate slogan, Martin H. Gambee, 118 Willoughby Avenue, Brooklyn, New York.

Second prize of \$200 for the second best poster, R. S. Feeley, Baldwinsville, New York.

Third prize of \$100 for the third best poster, H. Day Lowry, Richmond, Virginia.

The winning poster carries the slogan, "Wait! You may lose," and shows an automobile which has been stopped beside a railroad track while a large locomotive, pulling a heavy train, speeds over the crossing. The poster is in yellow, red and black colors.



## Says Light Motor-Driven Rail Cars Stop Branch Line Losses

**N. T. I. Secretary Observes That Gas Driven Devices Are Coming Into Profitable Use**

SOUTH HAVEN, Mich., May 26.—Addressing the Chamber of Commerce, Carleton B. Hutchings, secretary of the National Transportation Institute, spoke enthusiastically of the development of the motor-driven rail cars, which, he says, permit of fast and adequate service on branch lines which in turn enable smaller cities to hold their manufacturing and shipping business and also to build them up.

Speaking of the difficulty of maintaining good rail service on short line railroads and branch lines, Mr. Hutchings pointed out that "light weight motor-driven railway cars are coming rapidly into use to turn branch line deficits into profits."

On this subject, he said:

"Since the war 60 railroads or more have installed gasoline-driven railway cars in local service on branches or sections of their lines. Revolutionary changes in transportation practices already are taking place. Besides the steady development of highway transportation there has recently been a revival of activity in the field of the short-line railway.

"The automotive industry is scarcely 30 years old. The experiments with combustion engines on railway cars were undertaken only after the motor vehicle had established itself as a permanent commercial utility. More progress has been made in the past five years toward the solution of the problem of the short-line railroad than in the previous 25 years.

"It will be many years before this transition from present methods of branch line operation to the new basis is generally accomplished. There can no longer be any doubt that such transition is taking place. Early experiments resulted in some costly failures and delays, but have resulted in the development of efficient and durable types of cars which are now coming into regular use on many railroads.

"One of the great northwestern railway systems on one of its branch lines operates one of these cars, making 188 miles a day. During the first nine months of operation it netted \$18,000 from this service, after deducting all operating expense, a high rate of depreciation and interest. The railroad lost through its operation of a steam train for the same number of trips on this branch line \$25,000 a year.

"The solution of one important phase of America's transportation problem seems to be within reach and business prospects of a small community are greatly enhanced by this recent development."

## Seats for Sal and a Stall for Liz

LOS ANGELES, May 26.—An innovation in motor vehicle parking for theater patrons became effective here with the opening of the new Forum theater. The theater maintains a private parking station and when theater seats are purchased, if it is desired, a numbered parking stall may be obtained at the same time upon payment of an additional ten cents.

The patron is presented with a numbered coupon, the number corresponding to that of a stall. The space is held exclusively for him the same as are the seats in the theater.

Accommodations are provided for 500 cars. No tipping of employees is permitted. The facilities are such that patrons may arrive, park their cars and occupy seats in the theater within five minutes.

## Grade Crossing Mishaps in 1923 20% Higher Than 1922

WASHINGTON, May 24.—A total of 8582 people were killed or injured at grade crossings in 1923, it has just been revealed here in revised statistics issued by the Department of Commerce. This represents an increase of nearly 20 per cent over the number killed or injured in 1922 and proves that railroad grade crossing accidents continue to be one of the most serious problems confronting the country.

It is true that the number of motor vehicles in use increased somewhat more than 20 per cent in 1923, but safety students say increased volume of traffic should be met with increased protection; it should not be accepted as a satisfactory excuse for the mounting death toll.

Safety campaigns and grade crossing elimination have undoubtedly kept the number of accidents and deaths from reaching much more appalling figures, but, as government officials point out, it is apparent that a still greater effort must be made if the accident rate is to be reduced.

## \$125,000 FIRE LOSS

MILWAUKEE, May 5.—The A. H. Petersen Manufacturing Co., Milwaukee, a large manufacturer of electric tools, drills, punches, riveting hammers, sustained an estimated loss of \$125,000 by fire recently which gutted the building and ruined most of the equipment. Fire of a similar nature in December damaged the plant \$20,000. The Petersen company carried a total of \$126,200 insurance on buildings and contents, and \$60,000 addition in use and occupancy insurance. Arrangements relative to reconstruction await the adjustment of insurance losses.

## Prophets See Express Highway As Development of Congestion

**Predictions of Elevated Streets and Other Devices Also Heard at New York Gathering**

NEW YORK, May 26.—Father Knickerbocker, aroused at last to the necessity of devising ways and means of solving the traffic congestion problem not alone in Manhattan, but the surrounding country as well, tackled the subject in earnest when more than 900 delegates, representing 411 municipalities, discussed the situation and made plans for the future.

The meeting was called by the Committee on a Regional Plan of New York and Its Environs and the delegates were representatives of municipalities embraced in the region, which includes 5,000 square miles and takes in New York City, Long Island, Westchester and parts of New Jersey and Connecticut. The main action was adoption of a resolution urging appointment of an advisory committee representing the region, which in turn would appoint an executive committee to work in harmony with the Committee on a Regional Plan for New York and Its Environs.

Mayor Hylan, of New York City, Governor Silzer of New Jersey and other notables took part in the discussions, and experts predicted radical innovations such as express highways, which would develop seven times the capacity of modern streets, arcaded elevated sidewalks, one-way streets and the abolition of elevated structures, while Mayor Hylan reiterated his policy of scrapping the surface car lines.

Probably the most sensational discovery of the investigators was that the cost of street traffic congestion on Manhattan Island is estimated at \$500,000 a day and the cost of congestion in the area known as the Region of New York and Its Environs is estimated at \$1,000,000 a day. This compares with \$200,000 daily in Chicago, \$100,000 in Cincinnati and \$35,000 in Worcester, Mass.

## Big Run on Balloon Tires Is Reported by Rickenbacker

DETROIT, May 26.—The Rickenbacker Motor Car Co. reports demand for cars running almost 100 per cent for balloon tire equipment, following its offer of balloons as optional equipment on its regular run of models. The price for the balloon tire equipment is \$100 extra, this including five tires. The coming is using a 5.77 type tire on a 22-in. wheel. Dealer stocks of cars with the regular tire equipment are reported by the company as being low so that there will be no necessity of shipping balloon tires and wheels to replace existing equipment. Indications from present demand are that the balloon tire business will dominate all buying.

## Too Easy Credit Creates False Living Standard, Says Jordan

### Manufacturer Declares Slack Sales Indicate Too Few Dealers To Handle Trade-ins

CLEVELAND, May 26.—Edward S. Jordan, president of the Jordan Motor Co., warned Cleveland credit men against making credit too easy to obtain. He gave this warning while speaking at the annual meeting of the Cleveland Credit Men's Association in Hotel Cleveland.

By making it too easy to obtain credit, he remarked, a false standard of living is created. The standard rises higher and higher while times are good and then when employment is scarce the situation becomes very aggravated. Too easy credit, Mr. Jordan, observed, makes conditions unsteady.

Turning to the automobile industry, the speaker said if there is a slackening of sales of automobiles, it does not mean that the public demand or public desire for cars has let up or slackened. It simply means that there are not enough dealers to buy back the used cars that the owners want to trade in on new cars. Every owner of a used car, with few exceptions, wants to trade in his automobile, but the dealers can't take them, he asserted.

### 90 Per Cent Credit

The dealers' problems were considered, the biggest one being that of financing purchases of cars for 10, 12, 14 and 16 months, and then being compelled to buy from the manufacturer with sight draft attached to bill of lading. Ninety per cent of the dealers' sales, it was said, are on credit.

Prospects for the remainder of the year were discussed, as was the saturation point. The latter was dismissed as being too far in the future to be considered a problem.

### NEW AUTOMOBILE SPECIAL

MEMPHIS, May 26.—The Tennessee-Carolina Automobile Special, a new daily freight train from Cincinnati and Louisville to Asheville, has just been inaugurated by the Southern Railway system to provide through service for the growing movement of automobiles and related traffic to points in East Tennessee, North Carolina and South Carolina.

This train handles all cars of automobiles, trucks, engines, bodies, parts, tires and other accessories received by the Southern at Cincinnati or Louisville for territory reached through Knoxville and Asheville. It is moved as a solid train with no stops en route except to change crews.

The Southern recently established a special automobile train from Cincinnati to Atlanta and this has proved so successful that it was decided to establish a similar service for East Tennessee and the Carolinas.

## Putting the Pay in Coopay

DETROIT, May 26.—It takes more money to buy a coupe (coopay), than a coupe (coop), according to a ruling in Federal District court here, and lawyers with cases to try involving one of these vehicles are reminded to so distinguish in the future.

The ruling came about as result of trial before Judge Simons of W. C. Stanton charged with transporting a stolen vehicle of the disputed nomenclature. One of the attorneys insisted on referring to the vehicle as a "coop" while the other was just as superior with "coopay."

"We might as well come to an understanding as to the pronunciation of that word," said the judge. "If it costs less than a certain figure (not mentioned), it's a 'coop'; if more than that it's a 'coopay.'"

Therefore both lawyers referred to it as a "coopay," so it must have been one.

## Yellow Cab Manufacturing Branch Is Formed In Paris

PARIS, May 26.—With a capital of 1,500,000 francs, a branch of the Yellow Cab Manufacturing Company has been formed in France, under the title of Societe Francaise des Automobiles Yellow, to import, export, assemble and manufacture automobiles produced by the well-known Chicago firm. A couple of years ago a small French company got on the streets of Paris with a number of Renault taxicabs painted yellow and bearing the title "Yellow Taxi," and as a consequence the Paris branch of the Chicago firm has had to select a title which would not clash with this.

The directors of the French Yellow Cab Manufacturing Company are Albert N. Connett, banker; Henry Ducasse, engineer; Paul Dutasta, ambassador; Marcel de Jarny, engineer; Marie Albert Guoinin, Leon Hemsy, Salvador de Lopez and Fernand Raux. The registered offices of the company are at 126 rue de Provence, Paris.

### CONSIDER TOURIST CAMP

MONTREAL, Can., May 26.—Following the example of municipalities in the United States and Ontario, Montreal is likely to open motor tourists' camping grounds on city property, in accordance with a request made by a delegation of the Province of Quebec Tourists Association which waited on the Executive Committee at the City Hall.

The committee has taken the matter under advisement. It was stated that some 10,000 parking grounds have been provided in the United States while Ontario had 250 municipal camps.

## Noyes New London Used Car Plan Operating in 17 Cities

### Exchange Gives Certificate Which Owner Can Apply as Cash on New Machine

NEW LONDON, Conn., May 26.—The Noyes New London used car plan is now operating in 15 cities of Connecticut and two in Massachusetts.

Under the plan co-operating dealers do not take used cars in trade but take the customer to a central exchange operated by a corporation of dealer stockholders where the car is taken in at an appraised value and a certificate given the owner which he can turn in at its full value in part payment on a new car.

According to John F. Noyes, Buick dealer of Mystic, Conn., and father of the plan, business in the exchange has been so good that the certificates in most cases have been redeemed within a few days, giving dealers cash instead of a used car.

In the cities where the plan is being worked the banks have given liberal support, loaning money for operating expenses to the exchanges.

The plan is in operation in the following cities: New London, Waterbury, Ansonia, Derby, Shelton, Bristol, Manchester, Bridgeport, Norwich, Middletown, Danbury, Willimantic, Meriden, Stamford, New Haven, all in Connecticut, and New Bedford and Worcester, Massachusetts.

### HIT AT TRAFFIC JAMS

NEW YORK, May 26. — Police executives in charge of traffic are trying a bold experiment in their effort to reduce congestion on the main thoroughfares, an order being put into effect barring more than 1,000 taxicabs from "cruising" on Fifth avenue looking for passengers. As a result of the first day's experiment, the cops declare it far easier to handle traffic on Fifth avenue, although the new order affected Broadway, because the chauffeurs, barred from the avenue, sought business on the Great White Way. The police also have decided to abolish the parking of private cars on the side streets in the business districts.

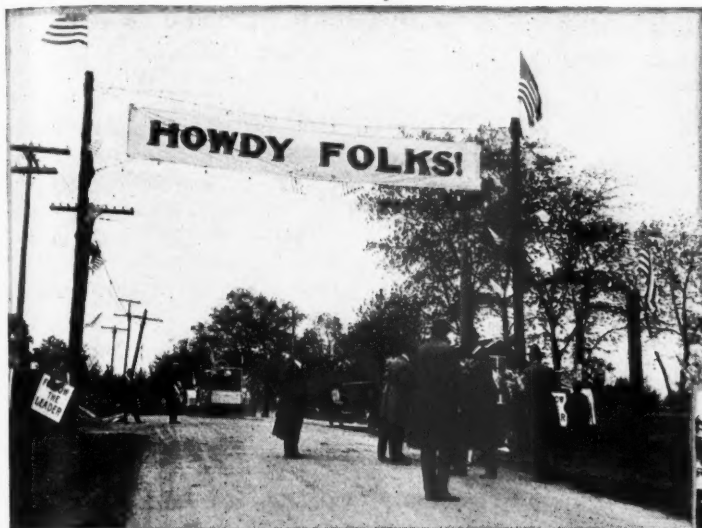
### MOON MOTOR PROFITS

NEW YORK, May 26.—Moon Motor Car Co.'s report for the first quarter of 1924 shows net income equal to \$1.12 a share on the 180,000 shares of no par value stock outstanding or an annual rate of \$4.48 a share. In the full 1923 year Moon Motor Car Co. showed profits equal to \$4.67 a share. The company has no preferred stock nor bonded indebtedness.

Net sales were practically the same as in the same period of 1923, but the net profit was less owing to the absorption of the getting-ready expense in January and February on the new Moon light six-cylinder model car which is now in full production.



## Boosting Roads "After They Are Built"



Pictures show some of the beauty spots along highways in the Kansas City district that the Kansas City dealers' organization are giving wide publicity. **UPPER LEFT**—Where the recent sociability run entered Excelsior Springs. **UPPER RIGHT**—The Excelsior Springs terminal of the new concrete highway linking that point with Kansas City; also a golf club. **LOWER LEFT**—A view on the hard surfaced road between St. Joseph and Faucett, Mo. **LOWER RIGHT**—a view on the hard surfaced road between St. Joseph and Atchison, Kan.

KANSAS CITY, Mo., May 26.—"Boost roads after they are built," is a new slogan of the Kansas City Motor Car Dealers' Association. The association has boosted for good roads; and its members have individually co-operated towards good roads. Now that the roads in Missouri and Kansas are being paved, the dealers are fathering projects to exploit the new highways, to celebrate their opening, and to help the motorists of the entire territory realize fully the benefits of the improvement.

The first important highway paved under the auspices of the Missouri Highway Commission on its \$60,000,000 bond issue program was completed a few weeks ago. It is considered the first "important" one because it leads from one place definitely to another, namely, from Kansas City, Mo., to Excelsior Springs, Mo.

The Kansas City Motor Car Dealers' Association therefore picked on this highway as one for which a celebration should be held. The association, with the co-operation of a local newspaper,

exploited a "sociability run" from Kansas City to Excelsior Springs on the day this celebration was held, Saturday, May 10. State officials, officers of automobile clubs and city officials of both cities, together with the officials of the Motor Car Dealers' Association, took part in the formal dedication services, at Excelsior Springs. The biggest end of the celebration, however, was the "run" to the springs. About 1,000 cars, each full of passengers, participated.

### TO SELL TRACTOR PLANT

MOLINE, Ill., May 26. — The Moline Plow Co., which recently decided to discontinue the manufacture of tractors, will sell machinery and other equipment of the Universal tractor plant at public auction on May 27, 28 and 29. The inventory has been appraised at \$1,500,000. Chicago auction companies will have charge of the sale. The space formerly occupied in the manufacture of tractors, will be devoted hereafter to agricultural implements.

### MANUFACTURER DIES

BUFFALO, N. Y., May 26.—Edward L. Thomas, age 42, vice-president of the E. R. Thomas Motor Car Co, automobile manufacturers of this city, died of heart disease in his apartment in the Wardman Park Hotel in Washington. He had been married two weeks previously and was planning a honeymoon trip to Europe. His father, E. R. Thomas, was president of the motor car company bearing his name.

### AT WORK ON SURVEY

BOSTON, May 26.—The Harvard Bureau of Business Research, which is conducting a survey of costs of doing business in the wholesale automotive equipment business and the retail tire business, has received replies to its questionnaires from 133 jobbers and 151 tire dealers. It is expected that tabulations on the two trades will be completed within a few weeks and final report published by the middle of the summer.

## West Texas and Oklahoma Promised Good Race Events

### Several Live Southwestern Towns Make Plans to Stage Summer Speed Shows

ABILENE, Texas, May 26.—With a marked increase in public interest due to successful meets held three successive years on the dirt track of the West Texas Fair Association of this city, the coming summer and fall promise to show a remarkable development of the automobile racing game in West Texas and Oklahoma. Already announcements of two meets have been made for the summer, with seven or eight other cities figuring on entering a circuit which, if completed, will provide a busy season for those drivers who elect to go after the money offered at these events.

Dirt track races under sanction of the American Automobile Association have been held twice yearly for the last three years at Abilene. These races have steadily grown in popularity and this year's program is regarded as certain to beat all former records. San Angelo entered the racing game last fall with a Three-A meeting and has announced a summer meeting for the present year. Childress, Brownwood and Amarillo are considering plans for summer meetings, as are Wichita Falls and Oklahoma City.

#### \$3,000 in Prizes

The program for the July Fourth meeting on the Abilene track has been issued, with a total of \$3,000 offered in prizes. Piston displacement is not considered in classifying the entrants, but time trials are used instead to separate the faster from the slower cars, and events are offered which will furnished fair competition for all comers.

Plans are now being matured for organizing all of the towns mentioned into a Three-A circuit for the season, and if this is accomplished, race drivers will be offered an opportunity to shoot at about \$25,000 in cash prizes in this section during the season. Roy C. Barton of Abilene is fostering the circuit idea.

#### NOVEL WINDOW STUNT

WASHINGTON, May 26.—An unusual and attractive sales and advertising stunt and one which can be duplicated by other dealers is being employed here by Dick Murphy, Inc., 1835 Fourteenth street. In the sales window of the establishment, suspended by three slender steel cables an Oldsmobile Six motor was permitted to run continuously for more than five days.

Attached to the transmission shaft was a speedometer, the face of which was sealed. Those who visited the salesroom were invited to estimate the number of miles that the motor would have traveled during this time if it were in a car. To the one who came nearest the actual speedometer reading a cash prize of \$50 was awarded.

## Radio Fans to Get Race Story

INDIANAPOLIS, May 26.—Arrangements have been made by the Prest-O-Lite Co. to broadcast the running of the 500-mile race on May 30 through the Chicago Tribune-Zenith station WGN, located at the Edgewater Beach Hotel, Chicago, with a wave length of 370 meters. The story will go on the air at 9:30 a. m., Central Standard time, and will be continuous until 3:30 p. m., or longer, if necessary.

The Prest-O-Lite Co. has sent to each of its 8,000 service stations and dealers diagrams of the speedway, together with a comprehensive table of statistics, so that radio fans may be able to follow the race intelligently.

#### TELLS PRODUCTION STORY

WASHINGTON, May 19.—A summarization of the progress made in American motor vehicle manufactures during the past 27 years, or since its inception, has just been compiled by the Automotive Division of the United States Department of Commerce. These figures on the production and exports of the American automotive industry, 1896 to 1923, include for the first time the latest revisions of 1923 figures and are believed to be almost completely accurate for the preceding years despite difficulties which have existed hitherto in securing uniform reports of production. The production statistics include the output of all plants in the United States and other branch factories in Canada.

## Plan Steps to Clear Muddle Involving Association's Data

### Series of Test Cases Contemplated By Attorney General Stone For Court Decisions

WASHINGTON, May 26.—A summary as to the rights of trade associations in supplying memberships with trade information are to be cleared up by the Department of Justice, which announces plans for a series of test cases in an effort to obtain court decisions on a number of points involved in the general question.

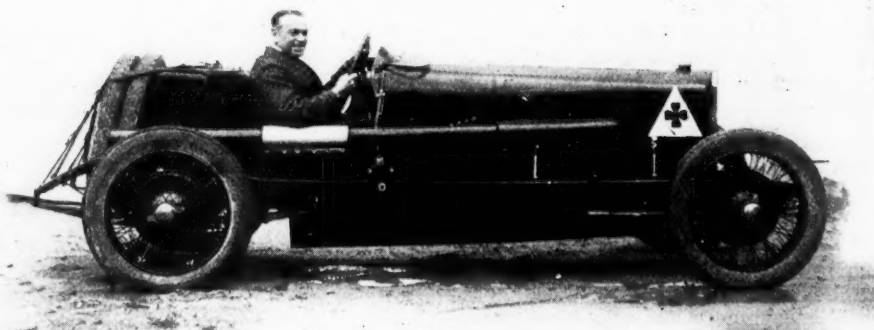
The appeal of the Maple Flooring Manufacturers' Association from a restraining order by the Michigan courts against those engaged in statistical activities, which has been set down for hearing on November 10 by the Supreme Court, is expected to furnish a test.

#### Departments Disagreed

Attorney General Stone has announced that he will give his personal attention to clearing up the muddle which has arisen largely through a difference of opinion between Secretary Hoover and former Attorney General Daugherty, who have had a running fire of correspondence over how far associations may go in efforts to co-operate in pursuits of their business.

While Mr. Stone has declined thus far to make known his views regarding trade association statistical activities, it is indicated at the department that the attorney general feels there is a distinct border line between what may be done and what may not be done by a trade organization in this field. To establish this boundary line clearly is understood to be the aim of the new attorney general.

## He Pressed Florio Cup Winner



Alfa Romeo stock sporting model which finished second to the winner in both the Targa Florio and Florio Cup races held recently at Palermo, Sicily. The engine is a six with overhead valves mounted in a detachable head and using dry sump scavenging lubrication. Count Masetti, the Italian amateur and one time winner of the Targa Florio, and Louis Wagner, veteran and internationally known race driver, were members of the four-car team of Alfa Romeo



## Code of Ethics Adopted By Electric Association's Board

Writing Evolved After Long Discussion Sets Forth List of Constructive Moral Rules

NEW YORK, May 26.—The board of governors of the Automotive Electric Association at a two-day session at Briarcliff Lodge adopted a code of ethics for general observation in business, which code has been under discussion for more than a year. The general tenor of the code relates to sound business methods to be followed not only by makers of starting, lighting and ignition apparatus and batteries among themselves, but for use in all their business affairs. Emphasis is given to following good business methods and the avoidance of "knocking," circulating misleading reports, and doing those other things that injure rather than build up. Some of the leading subjects of the code are:

As members of this association, we do not make false or misleading statements, either written or oral, or circulate rumors respecting a competitor's

- (a) Organization or personnel
- (b) Product
- (c) Selling price
- (d) Business
- (e) Plant capacity
- (f) Ability to deliver
- (g) Financial or personal standing
- (h) Infringement of patents.

In sales negotiations the efforts of salesmen should be confined to the merits of their own products except truthful comparison.

All equipment supplied should be equivalent in quality and performance to the samples furnished for test purposes.

We favor fair competition.

We make no misrepresentation in any advertisement, whether by direct statement, omission of facts, inference or subterfuge.

Last but not least, every member should test his every transaction by the standard of truth and justice.

The report of the standards committee showed that this work is being pushed vigorously. The work now in hand supplements the standards on generators and starting motors that have been set up, and relates to general wiring of the chassis, switches, grounded circuits, battery location, protection of wiring against water, sizes of cable to be used, distributor mounting on the engine, fuse clips, and many other details. This general standardization work is in the formative stages and it will be considered at the annual meeting of the association to be held at Eaglesmere Park, Eaglesmere, Pa., September 8, 9, 10 and 11.

### Business Manual

The service committee, under Earl Turner, general manager of the A. E. A., has drafted a business manual for the use of electric service stations. Although only in its formative stages, it is already

## Recently Named by St. Louis Dealers to Take Charge of Association Affairs



Left—President, F. C. McDonald, Southwest Nash Company. Right—Vice-President, G. M. Berry,



Berry Motor Car Co. Center—Treasurer, S. B. Ward, Ward Motor Car Company

a booklet of nearly 12,000 words and deals with the operation of an electric service station, including such questions as shop layout, equipment, stock of parts, methods of calculating overhead, and in short, everything that relates to the technical and business aspect of such a business.

The book will be revised for the Eaglesmere meeting and will then be passed upon by the association. The plan is to have it distributed to all electric service stations and perhaps to battery stations, the association and manufacturers co-operating in the work.

The question of giving free electric service for the 90-day guarantee period on the apparatus was a much mooted and much discussed topic. The makers of starting, light and ignition apparatus were about equally divided for and against such service. All agreed that the amount of such service is not large, but none the less a trouble question. While the majority felt that an iron-clad rule may be necessary, yet the difficulty in enforcement is because where apparatus proves defective after a short use, it should be made good under the guarantee and the owner not required to pay the labor charges connected with the repair.

The meeting was well attended, the battery representation being particularly large. President A. D. T. Libby presided at all the sessions.

## U. S. Court Refuses to Confirm Sale of the Fox Motor Car Co.

PHILADELPHIA, May 26.—On petition of Charles S. Rockey and C. K. Olberg, receivers for the Fox Motor Car Co., whose property at Seventh street and Grange avenue was sold at public auction to the highest bidder for \$230,000, as already reported, Judge Dickinson in Federal court has refused to confirm the sale. The receivers set forth that it is necessary for the property to bring at least \$325,000 to pay off the first and second mortgages and comply with the court's decree. The Kensington Trust Co. is holder of the first mortgage, which is for \$150,000, with 6 per cent interest. The petitioners ask leave to proceed to execute on the judgment. It is regarded as probable that the property will again be placed on public sale in June.

### NEW "ROW" SPRINGS UP

ST. LOUIS, Mo., May 26.—The tendency of automobile distributors to establish dealer agencies at busy points of St. Louis is shown by the new colony of automobile firms which has sprung up in the vicinity of Grand boulevard and Gravois avenue, a neighborhood which only recently has become a flourishing business center.

Within a radius of two blocks there are dealers selling thirteen lines of automobiles.

## WITH THE ASSOCIATIONS

### McDonald Given Gavel

ST. LOUIS, May 26.—Frank C. McDonald, president of the Southwest Nash Co., Nash distributors here, was elected president of the St. Louis Automobile Dealers Association at a meeting held at the Coranado Hotel. George M. Berry, president of the Berry Motor Car Co., Packard distributors on St. Louis, was elected vice-president and S. B. Ward, president of the Ward Motor Car Co., Maxwell, Chalmers and Chrysler distributor, was elected treasurer. Robert E. Lee was again appointed secretary and general manager of the association.

Phillip H. Brockman, president of the De Luxe Auto Co., Oldsmobile distributors; R. C. Frampton, of the Hudson-Frampton Co., Hudson-Essex distributors, and H. F. Fahrenkrog, of the Kardell Motor Car Co., Reo distributors, and retiring president of the association, were elected directors, each to serve two years. Those elected to the board of directors for the one year term were: A. E. Archer of the McCarthy-Archer Auto Co., H. C. S. distributors; A. J. Johnson, of the General Motors Truck Co., and H. W. Spalding, president of the Spalding Motor Car Co., Durant-Star distributors.

In his closing address to the members, Mr. Fahrenkrog reviewed the efforts of the association during the past two years and thanked the members for their hearty co-operation in serving on committees and doing other self-sacrificing work. Robert E. Lee, responding, presented Mr. Fahrenkrog with a handsome traveling bag.

The membership of the association is 100 per cent of the dealers in St. Louis.

### Merchandising Meetings

ATLANTA, Ga., May 26.—A board of directors has been appointed by the Atlanta Automobile Association to meet at regular intervals to consider and pass upon various matters affecting exclusively the interests of the allied trade lines division of the association, which includes tire, accessory, battery and similar dealers, but not the automobile and truck dealers. The principal work of the committee will be to map out a comprehensive merchandising series of meetings for the allied division, and to bring about, by these meetings, closer co-operation among tire and accessory dealers of the Atlanta and suburban territory.

The committee includes W. R. C. Smith, chairman; C. W. Dobbs, J. M. Cochran, Lon Creddele, E. H. Elleby, B. F. Hall, Wylie West, Charles W. Bell, F. G. Tegder, George P. Howard and Dunbar Abston.

The association also is getting its forces lined up for work before the Georgia State Legislature, when it convenes

this summer. Information has been received that there will be the usual number of bills introduced directly or indirectly affecting the automotive industry.

### Re-Elected Fifth Time

CINCINNATI, May 26. — William M. Perin has been re-elected president of the Cincinnati Automobile Club for the fifth consecutive time by the board of directors. Other officers elected were William T. Calerdine, first vice-president; F. H. Strietman, second vice-president; Monte J. Goble, third vice-president; A. E. Mittendorf, secretary, and Edward F. Romer, treasurer. The board of directors adopted a resolution favoring the establishment of a union bus terminal on the site of the public garage on Government Square in Cincinnati.

### Prepare For Organization

CHAMPAIGN, Ill., May 26.—Preliminary steps have been taken towards formation of a dealer organization in Champaign County, Illinois. When perfected it will become a branch of the Illinois Automotive Trade Association and also of the National Automobile Dealers' Association. At the first preliminary meeting Albert Rankin, banker of Springfield, delivered an address. C. W. Coons, secretary-manager of the state association, outlined the objects of that body, the work accomplished in the past and what is planned for the future. He also pointed out the importance of association action in protecting the motor vehicle dealer from detrimental legislation, and in promoting helpful legislation. Another meeting will be held shortly at which time it is expected organization will be perfected.

### Truck Dealer Section

LOS ANGELES, May 26.—An attempt is being made to organize the motor truck dealers of Los Angeles as a section of the California Truck Owners' Association. The truck dealers here have no organization. Many of them at one time or another have belonged to the Los Angeles Motor Car Dealers' Association, but inasmuch as there appeared to be no community of interest between passenger car and truck dealers, the latter have dropped their membership. There are a few instances of truck dealers who also represent passenger cars, remaining in the Motor Car Dealers' Association.

### State Theft Bureau

CHARLOTTE, N. C., May 26. — The North Carolina Department of State has announced establishment of a theft bureau to co-operate with local authorities in dealing with the stealing of automo-

biles. R. P. Harris is in charge of the bureau and he will have a staff of inspectors working throughout the state. Serial license numbers and serial motor numbers will be furnished the public for assistance in identifying machines.

### Charter Speedway

CHARLOTTE, N. C., May 26.—Charlotte Speedway, Inc., has been chartered by the state for the purpose of building a track and operating a speedway here. Authorized capital stock is \$300,000. C. L. Etheridge, J. M. Haralson, C. O. Kuester, George C. Leach and C. A. Cochran are the incorporators. George Long of Altoona, Pa., is promoting the track, and indications are the track will be built this summer and races staged this fall.

### Hold Annual Meeting

GALVA, Ill., May 26.—At the annual meeting of the Henry County Automotive Dealers' Association officers were elected as follows: President, Glenn K. Tracey of Kewanee; first vice-president, William Soderberg, Galva; second vice-president, G. C. Brown, Osco; third vice-president, Herbert White, Cambridge; secretary, G. R. Galloway; treasurer, Phillip Miller, Kewanee. There were talks by W. E. Johnston of Peoria, president of the dealers' association of that city; C. W. Coons, secretary-treasurer of the Illinois Automotive Trade Association, and R. H. Rhoades, secretary of the Mississippi Valley Motor Club. The Henry County association ranks with the most successful organizations of the kind in the state and has been highly advantageous to the membership since first launched.

### Body Builders to Meet

DETROIT, May 26.—Plans are rapidly maturing for the fourth annual convention of the Automobile Body Builders' Association and the third annual body builders' show, which will be held at Hotel Statler June 3 and 4. In arranging the program the association has had as its main aim the promotion of acquaintanceship and business among the makers of body materials and parts, passenger cars and commercial body builders and the car manufacturers.

The show will include displays of almost all materials and parts used in connection with body building as well as displays of a number of mechanical helps in the making of bodies and parts. Already most of the space available has been awarded.

The two major topics of the convention will be "Body Builders' Overhead Cost" and "Body Finishes," but the program is well made up and contains many other addresses of interest to this branch of the industry.

Among the speakers listed are Congressman R. H. Clancy of Michigan, leader of the fight on excise taxes; H. H. Rice, president of the Cadillac Motor Car Co., and David Beegroft of the Class Journal and Chilton companies.



# Gilbreath Starter of 500-Mile Race

## Well Known Speedway Fan of Detroit Is to Swing Red Flag

**Elimination Trials Will Be in Charge of Seth Klein, Indiana Sportsman**

INDIANAPOLIS, Ind., May 26.—Capt. W. C. Gilbreath, an automobile racing enthusiast since the inception of the thrilling sport, has been named official starter of the 500-mile race to be held at the Indianapolis Motor Speedway Friday, May 30.

He will wave the red flag that will send the 31 entrants on a 500-mile journey that annually is witnessed by more spectators than attend any other sporting event in America.

Gilbreath is a resident of Detroit, Mich., where he is manager of the Detroit Automobile Club. Seth Klein, an Indianapolis sportsman, will be assistant starter.

The elimination trials will be in charge of Klein, the assistant starter, while Gilbreath will assume a position above the track on the day of the race, with Klein handling the flags on the ground.

### New Starter's Platform

The historic swinging bridge, which was suspended over the start and finish wire of the Indianapolis course has been torn down and a new starter's platform, which is suspended only over the outside portion of the track at the start and finish mark, has been constructed.

For years the winning pilots of Indianapolis races have waved an acknowledgment to the checkered flag of victory, furling in the hands of an imposing array of starters, who stood on the suspension bridge. But the winner this year will send up an assenting salute to Captain Gilbreath as he stands on his little platform directly opposite the judge's stand waving the checkered flag that brings fame and fortune to the first car and driver to which it is shown.

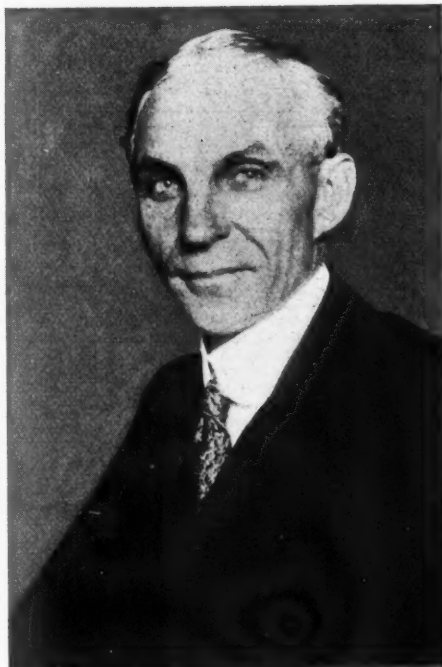
### An Important Post

The starter's post at the Indianapolis track is an important one. He is the man who runs the race. He starts the cars and stops them, slows them in case of mishap, and calls in cars for various reasons.

He has assistants on the various curves of the track ready to deliver flag messages to the drivers if he wants to get information to them after they have passed his post.

The red flag starts the race and denotes a clear course, yellow is a warning to slow down; white, stop for consultation; blue, accident on course; green, starting your last lap, and then comes the checkered flag—the finish.

## Will Referee Battle at Indianapolis



Henry Ford

## 1923 Crash Fails To Stop Alley

INDIANAPOLIS, May 26.—Tom Alley of Chicago, cigar chewing successor to Barney Oldfield in automobile racing competition, has been nominated to drive one of the Kess-Line entries in the International 500-mile race to be held at the Indianapolis Motor Speedway, Friday, May 30.

Alley, whose hair has turned auburn with being bared to the sun in all weather in many climes for years, cracked up his car coming out of a turn in last year's race and spent many weeks in a hospital.

But he is ready and willing to try all over again. Last season he was driving relief for the five-car Durant team, sponsored by Cliff Durant.

### GARAGE COLLAPSES

MILWAUKEE, May 26.—The garage, sales and service station of Schaefer & Hastrich, 1918 Greenfield avenue, Milwaukee, collapsed due to the undermining of the east wall by excavations for a new building on the adjoining site. Seven cars were completely wrecked and all equipment ruined, the loss being about \$35,000. A new building is to be erected.

## Cole Eight Picked to Pace Start of Indianapolis Mill

**Big Speed Eating Pack Gets Away Decoration Day Promptly at 10 A. M.**

INDIANAPOLIS, Ind., May 26.—The thirty-one cars entered in the International 500-mile race at the Indianapolis Motor Speedway, Friday, May 30, will be paced into a flying start by a Cole Eight.

The pacemaking car will leave the starting line promptly at 10 o'clock the morning of the race. The first row of racing cars will keep in line with it all around the first lap.

As the pace car and first row of racers cross the tape after swinging down the main stretch the starter will wave his red "They're off" sign from the bridge, and the pace car will finish the lap and then draw into the pits and off the track while the race drivers continue their thrilling journey.

The Indianapolis race has established a precedent of always starting on time. Promptly at 10 o'clock the cars get away.

The pacemaking lap of the Cole will be interesting because of the fact that it will mark the first appearance of balloon tires on the brick course, since they made their debut more than a year ago. It will be the only car on the track running on the new style tires. None of the racers will ride on balloons.

### OVERLAND WINS RUN

LOS ANGELES, May 26.—Averaging 29.36 miles per gallon of gasoline for 414 miles, an Overland touring car won the sweepstakes honors in the eighth annual Los Angeles to Yosemite Valley Economy Run, which finished Saturday. The Overland's ton mileage score was 49.61. Second place was won by the Willys-Knight and third by the Gardner. In their respective classes the winners were the Overland, Oakland, Kissel and McFarland. Oakland and McFarland were without competition in their classes. Fourteen cars participated.

### SO SAY REGISTRATIONS

SAN FRANCISCO, Cal., May 26.—Comparative figures made public by the division of motor vehicles of California indicate that this state will have 32.5 per cent more automobiles and motor trucks at the end of 1924 than were registered in 1923. The estimates of the division are based on a comparison of automotive licenses renewed during January and February of this year, showing a total of 932,548 automobiles and trucks registered during that period, as compared with 629,142 registrations during the same period of 1923.

## CONCERNING MEN YOU KNOW

Frederick Hollmann, president of the Hollmann Precision Ball Bearing Works, Wetzlar, Germany, who has been visiting American automotive factories, has returned to Germany, but not before placing some orders for machine tools and making a thorough examination of the latest American machine tool practices. Mr. Hollmann is one of the large manufacturers of ball bearings in Germany. He said, the automotive business is picking up in Germany after having been very slack during the winter months.

Walter P. Hanson, formerly advertising manager of the Haynes Automobile Co. and later holding the same position with the Stutz Motor Car Co., has succeeded J. L. Brownell as advertising manager of the Republic Motor Truck Co., of Alma, Mich.

Carl P. Spielberg, manager of the St. Louis branch of Willys-Overland, has announced that O. S. McKinney has been appointed wholesale manager of the branch in charge of sales to dealers in that district, comprising eastern Missouri, southern Illinois, Arkansas and parts of Kentucky and Tennessee. E. A. Magevney has been appointed chief of distribution to city dealers, of which there are 12, handling Willys-Knights and Overlands in St. Louis.

Maxwell, Chalmers and Chrysler salesmen of the Ward Motor Car Co., St. Louis and dealers from surrounding territory met in the offices of the company to hear Roy Coffeen, district supervisor of the Maxwell and Chrysler corporation, of Detroit, discuss new and used car sales. He declared the prospects in St. Louis district as he had observed them were excellent.

Chester Cook has been named sales manager of the South Side Chevrolet Co., St. Louis, which recently opened at Grand boulevard and Tholozan street. C. W. Pirimmen is president of the company. Mr. Cook has been in the automobile business for about ten years, having been a Chevrolet dealer in Pueblo, Colo.

J. Charles Hooper, former sales representative of the Oakes Co., of Indianapolis, has returned to the Cincinnati Ball Crank Co., with which he was identified prior to 1909, and will take charge of Balcrank bumper sales in the Eastern territory. As district manager he will not locate definitely in any one city, but will divide his time among the principle cities between Baltimore and Boston.

Wood Williams of Merrill, Lynch & Co., has been elected a director of Edmunds & Jones Corp.

D. Minard Shaw, who has been in charge of advertising of the Eastern division of the Ford Motor Co., has retired to become vice-president of the advertising agency of Jules P. Storm & Co. Mr. Shaw is a veteran who first formed contact with the automobile industry as vice-president and sales manager of the Mac Manus-Kelly advertising agency, entering the selling field as assistant sales manager of Earl Motors, Inc.

Coldwell S. Johnson of the General Motors Export Co. is visiting in Detroit after a long trip through the Far East. Mr. Johnson tells of a new route across the Syrian Desert from Haifa and Beirut to Bagdad for mail and transportation purposes over which Cadillac cars are used. The running time for a distance of 500 miles has been reduced from seven or eight weeks by camel travel to two days. Plans are being made to extend the route Eastward from Bagdad to Teheran, Persia, giving it a total extent practically equal to the distance from Detroit to New York.

H. P. White, who resigned from The H. L. Rackliff Company, Cleveland, O., last November to enter business for himself, has returned to the Rackliff organization. Mr. White will head up a new department in the organization, extending service to the smaller manufacturer who is unable to take advantage of the complete Rackliff service.

Otto C. Lang, with the Hydraulic Brake Co., of Detroit, since its incorporation as the Four Wheel Hydraulic Brake Co. in 1919, has been

made sales manager of the company. He has been associated with Malcolm Loughhead, inventor of the Lockheed Hydraulic system for more than 10 years.

P. L. Chase, formerly connected with the Republic Truck Corp., has been placed in charge of the new factory branch which the Mason Motor Truck Co., a Durant subsidiary, has opened in St. Louis. The Mason company also announces removal of its Philadelphia branch to 228 North Twenty-first street. This will be the distributing point for Eastern Pennsylvania, Southern New Jersey and Delaware.

Charles Schiear, of the Charles Schiear Motor Car Co., has been elected treasurer and Harry T. Gardner secretary-manager of the Cincinnati Automobile Dealers Association by the board of directors.

H. J. Smith, vice-president of the Southwest Nash Company, Nash distributors in St. Louis, likes fine horses, as the result of which his company has offered two cash prizes in connection with the Civilian Horse Show to be held at Jefferson Barracks.

John S. Blankney, secretary of the Shadbolt & Boyd Iron Co., Milwaukee, a large distributor of automotive equipment and materials, has been elected president of the Milwaukee Athletic Club. Roland S. Coerper, president of the Western Motor Supply Co., also extensively engaged in wholesaling automotive merchandise, tires, etc., was re-elected treasurer.

The resignation of Lake Jones as manager of the southern district for the Ajax Tire & Rubber Co., headquarters in Atlanta, has been announced. J. H. Callaghan, Atlanta branch manager for some years, has been named to succeed Mr. Jones as southern manager.

Will C. Pollard, for many years vice-president and sales manager for the Gray & Dudley Co., of Nashville, hardware and automotive accessory jobbers, has announced his resignation from the firm, effective at once. His successor has not yet been named.

Robert H. Martin, head of the Martin-Nash Motor Co., of Atlanta, and one of the best known automobile dealers in the South, has been elected to the presidency of the Capital City Club, of Atlanta, one of the best known clubs in the city.

Appointment of Claude Shine, 411 West Adams street, Jacksonville, Fla., as distributor of the Cooper line of tires and tubes in the Jacksonville and adjacent territory, has been announced by the Cooper corporation.

Changes in the personnel of the Victor Motors Inc., St. Louis truck manufacturers, recently announced are: Homer E. Smith, an expert on drafting and truck engineers and George Denny, a truck engineer added to the production force; Charles E. Dapron promoted to general superintendent, in charge of construction and Henry A. Schoknecht, former lubricating engineer of Standard Oil Co., to the same position with Victor and with added duties of purchasing agent.

Albert E. Lyman has taken charge of C. T. truck sales for the Electric Vehicle Co. Inc., in Springfield, Mass., and reports good progress in making sales and lining up prospects. The electric truck bids fair to win a large place in Western New England cities.

More than 200 persons, including members of all Buick dealer organizations in St. Louis gathered at the Vesper-Buick maintenance building recently to hear F. W. A. Vesper talk on his recent trip to Europe. Vesper illustrated his talk with stereopticon views.

O. E. Fishburn, formerly experimental engineer with the Warner Gear Co., Munice, Ind., has become affiliated with the J. W. Murray Mfg. Co. of Detroit.

David Perlson has been appointed export sales manager of the Stewart Motor Corp. For eight years he was in charge of the automotive department of the export house of Melchior. Armstrong, Dessau, Inc., of New York City.

## Jimmie Murphy Will Drive Miller at Lyons and Monzer

### Winner of French Grand Prix In 1921 Scheduled for More Appearances Abroad

PARIS, May 26.—Jimmie Murphy, the winner of the 1921 French Grand Prix, has been commissioned to drive Count Zborowski's eight-cylinder Miller in both the European Grand Prix at Lyons, on August 3, and the Italian Grand Prix on Monza track, next September. This will be Murphy's third appearance in Europe, for he drove a Miller in the Monza track 500-mile race last year, finishing third.

There will be twenty-two starters in the French race, as follows:

1. Sunbeam, H. O. D. Segrave.
2. Delage, Rene Thomas.
3. Alfa-Romeo, Count Masetti.
4. Schmid, Jules Goux.
5. Fiat, Felice Nazzaro.
6. Miller, Jimmie Murphy.
7. Bugatti, Pierre de Vizcaya.
8. Sunbeam, K. Lee Guinness.
9. Delage, R. Benoist.
10. Alfa-Romeo, Ascarl.
11. Schmid, Foresti.
12. Fiat, Pietro Bordino.
13. Bugatti, Ernest Friedrich.
14. Sunbeam, Dario Resta.
15. Delage, Albert Divo.
16. Alfa-Romeo, Campari.
17. Fiat, Salamano.
18. Bugatti, Prince de Cystria.
19. Alfa-Romeo, Louis Wagner.
20. Fiat, Pastore.
21. Bugatti, Constantini.
22. Bugatti, Marco.

Supercharger engines are likely to dominate in the European Grand Prix. Fiat will make use of this advice on the straight eights, which are last year's cars rebuilt, and will doubtless use it also on two special cars now under construction and regarding which no information has been given out. Delage has fitted a supercharger to the 12-cylinder V-type engine which was used last year and has also in hand a straight eight two-stroke with a supercharger built to Zoller patents. Sunbeam has built a supercharger into last year's six-cylinder racing engines and claims an increase of 33 per cent in the power output at all engine speeds above 2,000 revolutions. Experiments with a supercharger are being made on the cuff-valve Schmidts, the Miller and the Italian Alfa-Romeos. Ettore Bugatti announces that he will run his straight eights without a supercharger.

### OPEN NEW QUARTERS

LANSING, Mich., May 26.—The Motor Wheel Corporation, maker of Tuarc and Distell wheels, announces the opening of new quarters of the Steel Wheel Co. of New York, at 507 West Fifty-fifth street, presided over by John Creamer, metropolitan distributor of Motor Wheel products.

### BUSINESS GROWS RAPIDLY

ROCK ISLAND, Ill., May 26.—H. H. Hankins and Lawrence Paridon, who launched a motor vehicle accessory store at 2404 Third avenue, Rock Island, Ill., six years ago, with a stock of 13 tires, opened on April 4 a new plant at 415-419

Thirteenth street, Moline, Ill., with stock worth \$75,000, occupying 2,800 square feet of floor space and claimed to be the largest and most complete tire and accessory store west of Chicago. Last year, the tire business alone of the firm aggregated \$125,000.



## BUSINESS NOTES

Clarke S. Reed, Chicago, attorney, was appointed receiver for the American Steam Truck Company by Federal Judge Wilkerson. He was suggested by the stockholders at a mass meeting. It was voted to place the company upon an operating basis, rather than go through a liquidation process. The receiver will manage the interests of the company under the advisement of a stockholders board composed of H. G. Wehrwein, Benjamin Doehrn, both of Chicago, and H. J. Muhr and J. F. Ryan, both of Elgin.

Earl M. Hunker, president of the Ansted Spring and Axle Co., Connerville, Ind., has been named receiver for the concern as a result of suit brought by Robert H. Doepeke of Cincinnati. The receiver has been given full control and it is understood a plan to sell the assets in order to pay the outstanding indebtedness is under consideration. According to the suit an issue of \$225,000 first mortgage bonds is secured by a first mortgage on the property and a note signed by Frank B. Ansted and Robert H. Doepeke. It is said no part of the note has been paid. The mortgage was executed December 15, 1922 and the note became due June 15, 1923 according to the complaint.

The Commercial Credit Company, Baltimore, has leased the garage property at 1727-29 North Charles street, containing floor space of about 15,000 square feet, and will use the building for the distribution of repossessed automobiles.

The Curry Stout Motor Company, 612 Equitable Building, Baltimore, has been incorporated with \$75,000 capital stock by Charles W. Curry, George H. Stout and George P. Lucas.

The Hire A Ford Co., 295 Broadway street, Lorain, Ohio, has been incorporated with a capital of \$10,000 to operate and rent Ford automobiles. Incorporators are C. M. Farrell, J. M. Farrell, Alice Bacher, Robert E. Hakes and F. E. Pennington.

The Republic Auto Spring Works Co. has been chartered with a capital of \$25,000 to buy, sell, manufacture and repair motor vehicle and other springs, motor vehicle parts and accessories. Incorporators are L. C. Pettler, Fannie Pettler, Paul H. Zenk, Leatha L. Zenk, James A. Ewing.

Although Federal Judge Martin J. Wade at Davenport, Ia., has allowed fees to receivers and attorneys in the Perfection Tire & Rubber Co. bankruptcy settlement, he has continued until next term the disposition of \$1,300,000 bonds of the defunct Ft. Madison concern. The receiver of the plant and Charles W. Mills, Wilmington, Del., who bought the plant at sale both claimed the bonds. Paul S. Junkins was awarded \$18,000 receivers fees and expenses after the court had slashed all bills.

The J. F. Davis & Sons Co., DePere, Wis., manufacturer of special metal wheels for motor trucks, buses, tractors, etc., and conducting a large structural fabricating and boiler works, filed schedules in response to an involuntary petition in bankruptcy. Liabilities totaling \$333,035 are admitted, and assets amounting to \$309,997 are claimed.

Incorporation is announced of a large refinishing company to be known as the Modern Auto Refinishing Co., which has leased 10,000 ft. of space for this purpose in a Meridian street building, Indianapolis, and of the Herff-Jones Metal Products Co. to manufacture metal parts for automobiles and automobile hardware. The two concerns will be conducted by the same owners and in the same building but as separate companies. The Herff-Jones Metal Products Company is capitalized at \$100,000.

E. H. Odom, president of E. H. Odom Brothers Co., of Atlanta, manufacturers of machinery, has invented and patented a device for reconditioning motors. It will be manufactured in Atlanta at the Odom plant, stockholders having voted to increase the capital from \$25,000 to \$250,000 for this purpose. The machine is said to be used principally for reboring cylinders, the work being done without removing the motor from the automobile. It can be operated either by hand or electricity.

At the annual meeting of the Cleveland Tractor Co., the \$100 shares were changed to no par value. The authorized amount was cut from 60,000 to 50,000 shares. Officers re-elected: President, Rollin H. White, vice-president, R. T. Hodgkins, secretary-treasurer, C. D. Fleming.

The Universal Signal System Co. is the style of a new Milwaukee corporation capitalized at \$150,000 to manufacture a line of signals and signal systems, principally for automotive purposes. G. A. Koschin, manufacturer of electrical devices at 124 Second street, Milwaukee, is at the head of the new corporation, and associated with him are H. L. Duntz and Z. F. O'Leary. Plans for regular production are now being completed.

Automotive equipment, parts and materials will be manufactured by the Nuway Co., Inc., Milwaukee, incorporated with \$10,000 capital by William Baumhacker, 164 Martin street, Dr. L. C. Scharnhorst and C. G. Pieper. Baumhacker has been engaged in making parts and equipment for several years and this is a development of his business.

The Husky Wrench Co. of Milwaukee has been organized by a number of men formerly with the Snap-On Wrench Co. of Milwaukee, to engage in the similar line of manufacturing mechanics' tools, especially for garage and repair shop use and for original car kit equipment. The new concern is capitalized at \$50,000. Joseph O. Wirtish, 878 Fortieth street, formerly manager of the Snap-On company, and Siegmund Mandl and Oscar W. Engerson are the principles in the enterprise.

Franklin Motor Car Company, Wilmington, N. C. has been chartered with an authorized capital stock of \$100,000 and \$10,000 subscribed by L. F. Clark of Wilmington and C. E. Upchurch and H. L. Cameron of Raeford, N. C.

Roth Brothers & Co., Chicago, announce appointment of the following distributors of Roth Constant Potential Chargers; Interstate Motor Equipment Co., 114 E. Davis street, Raleigh, N. C.; Spokane Battery & Ignition Co., 1201 Sprague street, Spokane, Wash.; Keiser-Van Leer Co., Bloomington, Ill.; "Ambu"—American Bureau of Engineering, 2632 Prairie avenue, Chicago.

The Ireland & Matthews Manufacturing Company, Detroit, has arranged to manufacture and sell air cleaners for the Detroit Perfection Air Cleaner Co. This air cleaner was patented by E. R. Evans, chief engineer of Rickenbacker Motor Car Co. Ireland & Matthews are submitting samples to motor manufacturers.

The Eismann Magneto Corp. of New York announces that it has removed its Detroit office from 429, Willis avenue West to 4145 Cass avenue.

The Watson Stabilizer Company, Cincinnati, has been formed to handle distribution in this territory of Watson stabilizers. The new distributing organization is headed by Etzel Barker with C. M. Arnold as sales manager. Robert Gilliam will be assistant to Mr. Arnold.

The Hoadly Motor Company, Cincinnati, has been incorporated for \$50,000. Incorporators were George Hoadly, Jr., George Hoadly, B. S. Oppenheimer, A. W. Goldsmith, Jr., and C. A. Herrick.

Winkler's Hotel in Springfield, Mass., is about to be dismantled and replaced with a two-story brick and concrete garage to cost \$90,000. Gilbert H. Chaplin, formerly one of the proprietors of the Three-Level Garage in Springfield, is one of the incorporators of the concern (Orelinney, Inc.) that is to build the new garage.

The Mason Tire and Rubber Co., Cleveland, reported an operating profit of \$144,840 for 1923, but after interest charges, shutdown and miscellaneous expenses, the annual statement shows a net loss of \$535,774. Balance sheet shows an increase in good will and organization expense of \$250,446. This is accounted for by the fact that certain expenses totaling \$342,333 were capitalized, and a state tax was levied of \$1,000 on the increase of Series B. Common stock. May business is running ahead of April, which was 13 per cent greater than that of April 1923. Costs have been reduced and earnings are increasing according to the officials of the company.

Moon Bros. Mfg. Co., of St. Louis, makers of the Traveler body for Fords in which the seats can be changed into a bed at any time has announced a new price for their product of \$325. Officials of the company assert that the large demand has enabled them to make the reduction.

The Modern Automobile Signal Light Company has been organized by C. A. Burks of Decatur and O. C. Sinclair of Chicago. Manufacturing was first commenced in Chicago, but it has been found advantageous to remove to Decatur. A suitable building is now being sought. The signal is flashed from the rear of the vehicle and indicates whether the driver plans to turn to right or left, or stop. The turn signals are operated from the steering wheel and the stop signal by the foot brake.

Manufacturing operations have been resumed by the General Utility Battery Company of East Moline, Ill., after suspension of a month, to permit re-financing. This has been arranged and it is said the plant will be operated upon a larger scale than in the past.

## Statistics Place April Car and Truck Output at 373,139

Figures Prepared by Department of Commerce Show Slight Decline Under March

WASHINGTON, May 26.—Figures compiled by the Department of Commerce place April production of automobiles and motor trucks at 373,139, as against 382,456 in March and compared with 382,746 in April of last year. This is a decline of less than 3 per cent from March output. Previous estimates had put the total for last month at 358,600.

Detailed figures, segregating cars and trucks, follow:

PASSENGER CARS			
	1922	1923	1924
January	81,006	*223,822	287,302
February	109,171	*254,782	336,373
March	152,062	*319,780	*348,350
April	197,224	*344,661	337,037
May	232,462	*350,460	
June	263,053	*337,402	
July	*225,103	*297,371	
August	*240,498	*314,399	
September	*187,711	*298,928	
October	*217,582	335,023	
November	*215,362	284,023	
December	*208,016	275,439	

TRUCKS			
	1922	1923	1924
January	*9,596	*19,732	28,922
February	*13,360	*22,173	*31,151
March	*20,036	*35,284	*34,106
April	*22,665	*38,085	36,102
May	*24,120	*43,730	
June	*26,354	*41,173	
July	*22,083	*30,692	
August	*24,711	*30,872	
September	*19,495	*28,578	
October	*21,824	*30,139	
November	*21,967	*28,073	
December	*20,394	*27,762	

\*Revised.

## PLAN 23-STORY GARAGE

CHICAGO, May 26.—If announced plans are carried into effect, Chicago's proposed Tower of Jewels, a forty-story structure, to house the wholesale jewelry trade, will contain a feature that should contribute much toward solution of the parking problem in the vicinity of Wabash avenue and South Water street. That is where the new building is to be situated.

There will be no court to this building, 23 floors of the usual court space being taken up by a garage. Cars will be taken to the different floors with a system of automatic delivery.

## RECORD TELLS OF MANY SALES

COLUMBUS, Ohio, May 26.—According to the monthly report of County Clerk Harold C. Gockenbach, more automobiles were bought in Franklin County in April of this year than in any previous month. Records show that a total of 5,880 cars were bought of which 1,940 were new cars and the remainder used vehicles. The largest number sold in any month previously was in August 1923 when 5,689 cars changed hands. The best day was April 22 when 402 bills of sale were filed with the clerk, showing 136 new cars disposed of that day.

## IN THE RETAIL FIELD

New Chandler dealers: Citizens Auto Company, Crawfordsville, Ind.; J. A. Prichard, Franklin, Ind.; Wilson & Murray, Hyannis, Mass.; H. R. Warr, Los Angeles, Cal.; A. W. Arbough, Portland, Ind.

Wills Sainte Claire dealers: James A. Ellenor, Sarnia, Ontario; Bandur Motor Sales Co., Chicago; A. Park Shaw, Pittsfield, Mass.; Campbell Motor Sales Corp., Beckley, W. Va.; The Howe Company, Wheeling, W. Va.; Claremont Garage, Claremont, N. H.; Myers Motor Co., Altoona, Pa.; C. Peyton Watkins, Fort Myers, Fla.; C. K. Smith, New London, Conn.; Gem City Motor Sales Co., Quincy, Ill.; W. E. Widmer, Excelsior, Springs, Mo.; Chas. E. Stutz Sales Co., Indianapolis, Ind.

The Goodfellow Garage, St. Louis, of which George Hutchins is manager has been added to the dealer organization of the De Luxe Automobile Co., Oldsmobile distributors in St. Louis. Phillip H. Brockman, president of the De Luxe Co., says his dealer organization has grown rapidly since the new models of the Oldsmobile came out last fall.

St. Louis automobile dealers celebrated another "used car" week with good results. Red tags and stickers decorated all the show windows announcing used car bargains and a parade of used cars with Robert E. Lee secretary of the association acting as grand marshal, was held on the last day. Dealers said that sales of used cars broke all records during the week.

W. F. Frick and Son, Guy, Keithsburg, Ill., have purchased a site for a new garage, filling station and salesroom. A rest room for tourists will be a feature of the building. The Frick company has the Star and Durant agency for this territory. Work on the new building will be started at once.

Roy H. Ketterhagen, Palmyra, Wis., has acquired the Ford Garage, including the Ford franchise, at East Troy, Wis. He has been associated with his brother, Werner Ketterhagen, Ford dealer at Palmyra.

M. Vincent Anderson, Fond du Lac, Wis., has been appointed Gray dealer in Fond du Lac county, with headquarters at 36-38 West Second street.

Leo J. Longdin, of the Longdin Motor Co., 14 West Second street, Fond du Lac, Wis., has relinquished the Auburn franchise and acquired a rollin dealership.

The Ruggy Courtney Motors, Inc., Salem, O., has been chartered with an authorized capital of \$25,000 to buy, sell and deal in automobiles, trucks, parts and accessories. Incorporators are: A. R. Courtney, F. R. Pow, R. W. Ruggy, J. H. Sharp and R. W. Campbell.

The Arragan Auto Painting Co., Cincinnati, has been incorporated with a capital of \$25,000 to paint and enamel automobiles and trucks. Incorporators are: Frank Rapold, John E. Ginandt, Pasquale Arcaro, Arthur R. Spangenberg and Otto G. Spangenberg.

A formal opening has been held by the Overland-Knight sales company, a company recently formed and authorized to handle Overlands and Willys-Knight cars in St. Louis at Grand boulevard and Potomac street. The firm is a partnership composed of A. P. Cook and Harry Murphy who have previously been connected with the sales force of the Willys-Knight Overland branch in St. Louis.

The Hendley Motor Company of Washington, D. C., announces an exclusive Lincoln sales and service station at 1132 Connecticut avenue. C. W. Hendley started with the Ford Motor Company in 1914. He was later clerk of the Washington branch of the company and at the home office.

The H. T. and B. Sales and Service, Cincinnati, has been appointed associate distributors in Cincinnati territory for the Maxwell and Chrysler. B. C. Murphy is president of the company and G. P. Burris is general manager.

Rebuilding at once the sales building and service station of the Miami Cadillac Co., 1740 N. E. Second avenue, Miami, Fla., is contemplated by the company, according to J. E. Junkin, Jr., president. The plant recently was destroyed by fire at a loss of \$30,000.

G. F. Hinkle, for the past nine years distributor of the Kissel line in the North and South Carolina territory, has been named distributor in the entire Southeast with headquarters at 451 Peachtree street, Atlanta, according to an announcement by the Kissel Motor Car Co.

The Martin Chevrolet Company has just been formed at Richmond, Va., making the third Chevrolet agency in the city. The new company will have headquarters in South Richmond. C. N. Martin, J. Harvie and N. W. Martin are

incorporators. The capital stock is \$30,000. The company expects to open its doors in the next few days.

Meredith Motor Company, 311 North Main street, Burlington, Iowa, has taken over the Oakland contract for this territory. Clyde Meredith is thus returning after many years to the car which he first represented in this field.

Frank S. Wells and William Woodruff, 1609 Fourth avenue, Rock Island, Ill., have taken over the Auburn agency for the tri-cities and surrounding community. Mr. Woodruff was formerly with the Schillo Motor Sales, Chicago, and before that with the Douglas Burrelle, Inc., New York City.

K. C. Grigsby, formerly secretary of the Joliet-Buick company, Joliet, Ill., has severed his connection with the firm. His interest has been taken over by Paul J. Killen and Dammis de Geius.

Joseph G. Corey, Inc., Park and Washington streets, Hartford, Conn., has taken on the Chevrolet and Buick as an associated dealer under the Hartford Buick Co. and the Boulevard Chevrolet Co.

The Motor Sales Co., 252 Main street, Hartford, Conn., Ford, Fordson and Lincoln dealers, have taken a store opposite the present location, which is being put in order for occupancy by June 1. The new location is more convenient to the John street service station.

William Morris, Hudson and Essex dealer and distributor at Dallas, Texas, is doing some "individual advertising" with telling effects. Every day in the daily papers of Dallas he runs an advertisement showing some new Dallas person who is "driving an Essex." Mr. Morris declares this "individual advertising" hits the spot.

The Nash-McLarty motor company of Dallas is at home in its new building, especially arranged for automobile selling purposes. The formal opening was a house warming attended by hundreds of persons. Refreshments were served and there was music and dancing. The sales room in the new building is said to be one of the finest in the southwest.

New Auburn dealers: Hart Motor Sales, Ashtabula, Ohio; Andover Auburn Sales Company, Andover, Ohio; J. N. Beltz, Erie, Colo.; Sacco's Garage, Utica, N. Y.; The Central Garage, (H. S. Carter), Clifton Forge, Va.; Mayhew Auto Service, Duluth, Minn.; M. A. Nockels, Enderlin, No. Dak.

Atlanta and Birmingham salesmen of Willys-Overland cars are having an Overland sales contest. The reason for the contest is that the Birmingham salesmen sold more in April than the boys in Atlanta. Furthermore, they announced they would do it again in May. The Atlanta salesmen accepted the challenge.

Eric Severin and Claude McCamish have secured the Rock Island, Ill., agency for the Gray motor car and are located at 315 Twenty-fourth street.

When Percy Grant, Fort Worth Ford and Lincoln dealer and distributor, does a thing he does it right. He had Fort Worth out to the opening of his new quarter million auto home, and Fort Worth is going to remember the occasion. Grant advertised his housewarming extensively and he put on a show which made 'em sit up and take notice. It is estimated 30,000 people attended the party. Percy Grant fed 'em and gave 'em drinks, music and dancing. It is reported orders for more than 125 cars were taken as a result of the party, and Grant didn't try to sell a car during the housewarming. The formal opening of the Grant building was the biggest thing of its kind ever staged in Fort Worth.

The Columbia Motors Co., Detroit, announces appointment of the following Columbia Six dealers: Young Motor Co., Bellaire, Ohio; Virgil Strader, Phillips, W. Va.; West Side Garage, Utica, N. Y.; Malvin Dougherty, Toledo, Ohio; Columbia Sales and Service Co., Lansing, Mich.; Cook Motor Co., Peoria, Ill.; Woodstock Quality Garage, Woodstock, Ill.; A. C. Moorhead, Findlay, Ohio; Columbia and Liberty Service Station, Inc., New York, N. Y.; Griffith's Garage, Mt. Holly, N. J.; South Tamaqua Garage, Tamaqua, Pa.; W. G. Frisbie, Egg Harbor, N. J.; Chester E. Groff, Lancaster, Pa.; Langdon Garage, Hilton, N. J.; B. F. Tuthill, Roselle Park, N. J.; Anderson & McGaffin, Newark, N. J.; P. A. Sylvester, Boundbrook, N. J.; Columbia Auto Sales, Jamaica and Freeport, L. I.; Geo. J. Donahue Auto Co., Inc., Brooklyn, N. Y.; R. H. Zielke, Garwood, N. J.; Norwood Motor Co., Inc., Brooklyn, N. Y.; Cornelia Garage & Sales Co., Queens, N. Y.; W. E. Young & Co., Los Angeles, Cal.

## Santa Barbara Dealers Pleased With Used Car Marketing Plan

### Only Seven Repossessions During Initial Year in Which 800 Cars Are Handled

SANTA BARBARA, Cal., May 26.—According to C. M. Glover, secretary of the Automobile Trade Association of Santa Barbara, 12 automobile dealers in that city co-operated something over a year ago to employ an appraiser of used cars offered in exchange for new models and to operate a market for the disposal of such second-hand cars as were taken in exchange. All of the dealers agreed to absolutely retire from handling used cars. The Certified Used Car market was the result of this arrangement, and that it has been a success is borne out by the following letter.

"Earl Franklin, Manager, Santa Barbara Certified Used Car Market.

"Dear Sir:—On this, the first anniversary of the Certified Used Car market we, the undersigned dealers, desire to extend a token of appreciation for the valuable service you have rendered us during the past year. We wish to express our appreciation of your untiring efforts to make the market a success and assure you that you will receive even greater co-operation from us in the future than you have enjoyed in the past.

"Yours for a very successful year,  
"Paige-Jewett Motor W. J. Boothe  
Sales Co. M. A. Durkee  
Santa Barbara Motor Blake Motor Car Co.  
Co. C. L. Ross Co.  
Hollingsworth-Over- Victor C. E. Harlow  
land Co. Hitchcock Motor Co.  
Matthiessen Motor Co. Spoor Motor Co.  
Vincent E. Wood."

During the year just closed more than 800 cars have been sold through the market, and but seven repossessions have been made during that period. Appraised cars remain the property of the owner, or the dealer as the owner's agent, until disposed of. They are reconditioned at the owner's expense. The reconditioning expense as well as 10 per cent to cover the market's charge for selling the car are deducted, and the net appraisal is what the owner is credited with upon any new model that he sees fit to purchase.

No dealer has withdrawn from the market save where he has retired or disposed of his agency. Santa Barbara is a tourist community, and according to the secretary, the wealthiest visitors do not hesitate to patronize an institution that has done so much to stabilize used car values.

### NEW NAME FOR PUMP COMPANY

MILWAUKEE, May 26.—The Milwaukee Circulating Pump Manufacturing Co. is the new style of the organization formerly known as the Cramer Manufacturing Co. An announcement of the change says it is desired to have the name more representative of the company's product.



# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

Chicago.....	Jan. 24-31, 1925.....	National Automobile Chamber of Commerce.
Green Bay, Wis.....	Aug. 25-30.....	Automotive Division, Association of Commerce, W. F. Kerwin, Manager.
Kansas City, Mo.....	Feb. 7-14, 1925.....	Kansas City Motor Car Dealers' Association Show.
Milwaukee, Wis.....	Aug. 25-30.....	Milwaukee Automotive Dealers' Association, Fall Show, Bart L. Ruddle, Manager.
New York.....	Jan. 3-10, 1925.....	National Automobile Chamber of Commerce.
Reno, Nev.....	June 14-21.....	Annual State Exposition under auspices of Reno Motor Car Dealers' Assn.
Sacramento, Cal.....	Sept. 1-10.....	State Agricultural Society, C. E. Paine, Manager.
Toronto, Ont.....	Aug. 23-Sept. 6.....	Canadian Automotive Equipment Association and the Automotive Industries of Canada, Gib Robertson, Secretary.

## FOREIGN SHOWS

London, Eng.....	Oct. 16-25.....	
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## CONVENTIONS

Albuquerque, N. M.....	May 26-31.....	U. S. Good Roads Exhibition.
Chicago.....	June 2-3.....	Convention of National Motor Regrinders and Rebuilders Association.
Selma, Ala.....	July 21-22.....	Midsummer meeting Alabama Automotive Traders' Association.
New York City.....	Jan. 7, 1925.....	New York Show, Convention N. A. D. A.; Hotel Commodore.
Chicago.....	Jan. 26-29, 1925.....	Eighth Annual Convention, N. A. D. A., Hotel La Salle.

## RACES

May 30.....	Indianapolis, Ind.....	Ind. Speedway Assn.....	500 Miles
May 30.....	Rochester, N. Y.....	Horace P. Murphy.....	Short Races
May 30.....	Byberry, Pa.....	Jay Nichols.....	Short Races
May 30.....	Bloomsburg, Pa.....	Jay Nichols.....	Short Races
May 30.....	Pottsville, Pa.....	I. D. Kirschner.....	Short Races
June 14.....	Altoona, Pa.....	Altoona Speedway Assn.....	250 Miles
July 4.....	Kansas City, Mo.....	K. C. Speedway Assn.....	250 Miles
July 4.....	Abilene, Texas.....	West Texas Fair.....	Short Races
Sept. 1.....	Altoona, Pa.....	Altoona Speedway Assn.....	250 Miles
Sept. 1.....	Colorado Springs, Colo.....	Pikes Peak Highway.....	12½ Miles
Sept. 13.....	Syracuse, N. Y.....	Horace P. Murphy.....	100 Miles
Oct. 4.....	Fresno, Cal.....	Fresno Speedway Assn.....	150 Miles
Oct. 19.....	Kansas City, Mo.....	K. C. Speedway Assn.....	250 Miles
Nov. 29.....	Los Angeles, Cal.....	L. A. Speedway Assn.....	250 Miles

## TIRE DEALERS BANKRUPT

CHICAGO, May 26.—Charles S. Peterson and M. Silverman, co-partners in the Better Tires Corp., Chicago, were adjudged bankrupts recently by Federal Judge Adam C. Cliffe. Mr. Peterson also has been highly identified in the printing industry and is a county commissioner. The court's action followed a petition filed May 3 by Mr. Silverman which marked the climax of rough sailing for the Better Tires Corp. It was declared in this petition that Mr. Peterson's personal liabilities were in excess of \$1,000,000 and that his indebtedness would outbalance his assets by more than \$500,000. It is said the liabilities of the Better Tires Corp. are around \$1,100,000, with assets of \$400,000. At the close of Saturday's hearing Carl R. Latham attorney for Mr. Peterson, issued a statement in which he said that his client is positive that his assets if properly administered will more than cover liabilities.

## \$130,000 FIRE LOSS

WAUPUN, Wis., May 26.—The sales and service building of the Waupun Auto Sales Co. was wrecked by explosion and fire with a loss estimated at \$50,000. Thirty-eight cars, including ten new cars ready for delivery, were lost beyond salvage, increasing the loss to about \$80,000.

## Room for Both Street Car and Bus, Says Trolley Body

NEW YORK, May 26.—Coincident with the celebration of the 36th birthday of the electric railway industry, the American Electric Railway Association issued a statement as to the present situation in the trolley world in which it emphasized the friendly feelings the street railways have for the motor vehicle. It says:

"Contrary to general opinion, national electric railway and motor car interests are not attempting to cut one another's throats. They believe that there is room for both the electric car and the motor bus in local transportation and are trying to co-operate."

At the present time the trolley industry represents almost \$6,000,000,000 and has an annual income of more than \$1,000,000,000. In the last year 16,000,000 people were carried on the electric railroads, which marks a new high record.

## \$3,047,679 FROM GAS TAX

SACRAMENTO, Cal., May 26.—Receipts from the 2-cent gasoline tax in California for the first quarter of 1923 amounted to \$3,047,679, an increase of \$64,424 over last quarter of 1923.

## STOP, LOOK, BUT DON'T LISTEN

CHICAGO, May 26.—The Chicago Automobile Trade Association has issued a circular warning its members to look out for a certain individual who passes bad checks and who seems to have a special liking for victims in the automotive industry. Here is his description:

Height, about five feet six or seven; weight, between 185 and 200; smooth shaven, well dressed, bad teeth, smokes black cigars, speaks with foreign accent and claims to speak fluently English, Spanish, French, German and Yiddish. Age, between 35 and 40.

A man answering this description, according to the C. A. T. A. circular, representing himself as Louis Harris, vice president of Harris Bros., Inc., Havana, Cuba, recently made a purchase from the United States Tire Co. and gave it a check on the National City Bank of New York that proved worthless.

## PROPOSES PHYSICAL TEST

SACRAMENTO, Cal., May 26.—Will H. Marsh, chief of the division of motor vehicles, has announced that he will seek legislation in the next California legislature requiring applicants for permits to operate motor vehicles to pass physical examinations as well as tests to prove their ability to handle a motor car.

# The READERS' CLEARING HOUSE

## Questions & Answers on Dealers' Problems

### Lincoln Connections

Q—Please send me a diagram of the charging circuit of the Lincoln car showing the inside connections of the ignition switch, also the inside of the generator, also show how the third brush controls the output and explain the two wires that are connected at the back of the generator. One is marked field, and the other is marked gen., and it will not charge unless both wires are in place, but you can cross them and it does not make any difference.

This diagram was published on page 49 of the February 28th, 1924, issue of MOTOR AGE, but we are mailing you by separate letter a copy of this page in case you have mislaid this issue of the paper. In the diagram the internal circuits of the motor generator are shown, the commutator at the left being the one for the starting motor portion of the machine while the commutator at the right represents the generator part.

In this diagram the brush location on the generator commutator does not seem to be exactly right. The generator brush shown at the right is apparently the grounded brush while the one at the top of the commutator is the live insulated brush so that the one at the bottom must be the third brush. Its location, however, should be around to the left a little bit so as to be nearly opposite the ground brush but not quite. It should be at the lower left hand portion of the commutator as seen in the diagram.

Connected just above the live generator brush is a switch which is opened when the starter is operated to prevent the generator portion of the machine from producing current while the rest of the machine is operating as a starter. This would take so much power that the cranking speed would be very slow. When the starting pedal has been released this switch makes contact again so that the machine can operate as a generator.

In the ignition switch the connection made is from the number five terminal which is live battery connection through the ammeter over to the number six and number eight terminals. This connects battery current to the armature and shunt field and this is the reason that reversing the wires does not make any difference. As far as we can see the only difference would be if a heavier wire is used for the armature connection and then we would be carrying the armature current which goes out to charge the battery through a small wire and would be using a large wire for the field current when a small one would do. Therefore aside from the question of wire size we cannot see that it makes any dif-

**The Readers' Clearing House**  
**THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.**

**All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.**

**Readers' names will not be published with articles, if a request to this effect is received with the letter.**

**Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.**

**Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.**

**Addresses of business firms will not be published in this department but will be supplied by letter.**

**Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.**

ference whether you reverse the wires or not.

### Effect of Tappet Clearance on Valve Timing and Engine Power

Q—We have another question in regard to checking the valves of a Lincoln. I understand how to check them all right and that the tappet clearance should be .003 inches. Sometimes, however, they are just a little noisy when set this way, this being true on the Leland built Lincoln, which does not have any opening into the crankcase to lubricate the valves. We have one customer who complains of the noise and we have set the valves at .0015 inches clearance in order to please him. This eliminates the click entirely, but the car then does not have quite as much pep as it does with the clearance set at .003 inches. When grinding the valves on this car we have not noticed that they were burnt, nor do they require grinding and more frequently than on cars set at .003 inches. We are, therefore, puzzled to know why it is that this change in clearance seems to affect the pep of the engine. Could it change the valve timing enough to make any difference. Can the intake and exhaust valves be set at different clearances and give a little more pep? Does a hot engine give the valves a little more clearance than when they are cold. —Sam Shankle, Long Beach, Calif.

Changing the tappet clearance does af-

### Misses at Fifteen

Q—We have two Fords, which have been reground, fitted with Kant-Skore pistons, tractor valves. These both work good going 15 miles per hour, but will miss if going slower. Now, we wonder if the valves are the cause of it or if a larger manifold will make it run slower. We have a Bosch ignition on one of them, but it don't work any better. Is a common Ford carburetor able to handle this running slow?—Claude Argo, Cozad, Nebr.

We believe the trouble, in not being able to throttle down, is due to the carburetor and we would suggest that you install any of the standard makes of carburetor rather than the original equipment. We are suggesting this, assuming that you have checked all other parts of the engine. In case you install a carburetor of the non-adjustable type it would be well to instruct the carburetor manufacturer of service station regarding the specifications of the engine as you have revised it.

fect the timing to a certain extent for it causes the valves to open sooner and close later. Whether this will noticeably affect the power of the engine, however, is a matter of experiment and you seem to have answered your own question by trying it both ways and finding that it does make a difference in the power. The same question of noisy valves and valves poorly lubricated was asked us in regard to another make of car and the recommendation was that a hole be drilled in behind the tappets so as to connect the crankcase with the compartment in which the valves operate.

It would accordingly seem as if this would prove a good remedy on the Lincoln car to which you refer and we would suggest your keeping this in mind and doing it at some time when you have the cylinder block off. This hole should be drilled in the flange of the cylinder block so as to connect with the crankcase. The question of changing the intake and exhaust valve clearance is again a matter of experiment but it is generally found that the factory recommendation is the best one to adhere to.

The matter of valve clearance hot and cold depends on whether the cylinder block or the valve stem becomes heated the most. Due to the fact that the exhaust gases pass out by the valve there is usually a tendency for the valve stem to expand more than the whole cylinder block so that the clearance generally becomes less. On overhead type engines however, this is often reversed for a long rod is used to transmit the motion from the camshaft to the rock arm and this rod is usually cooler than the cylinder block so that in this case the clearance becomes greater as the engine gets warm.



## This Shop Ideal

Q—Our business is retail and wholesale, passenger and commercial vehicles, repair parts, a small accessory business for our retail needs, a large stockroom for automobile parts and a good shop. Ninety feet front on national road; depth of lot 190 ft.; width of lot 92 ft. on other well traveled road. The difference in street level is 20 ft., roughly, and our plan is to erect a three-story building. This will be two stories below the national pike or main road. We expect to plan the building only 100 ft. in depth, leaving an open yard on which we will lay a concrete floor for the other 90 ft. In all probability we will put up a tile wall about 6 ft. high around this courtyard which will give us an excellent place for storage, tuning up and minor adjustments in good weather.

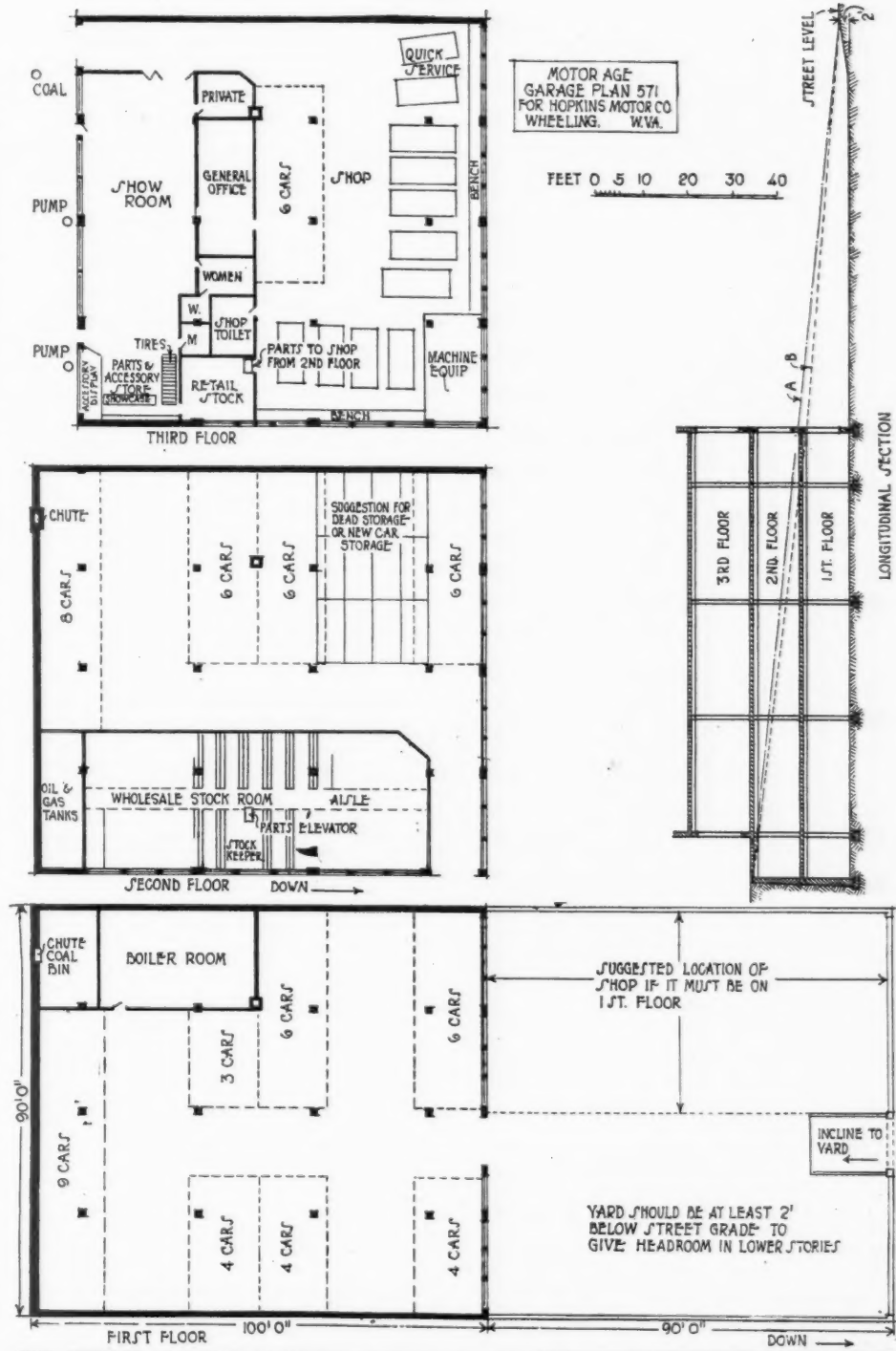
This would force the repair shop to be on the main floor. On the left of the building, looking forward in a city alley 12 ft. wide, which will be graded through from street to street, giving us an entrance to the second floor. The lot, at the present time, excavated so that the lower floor will be 90x100 ft. Second floor the same size and the third floor only 90x90 ft., being set back 10 ft. to give us a clear way inside of the sidewalk in front of the building. On this clear way we will have gasoline and oil pumps, beneath which will be stored the gasoline tanks, and on the lower floor the steam heating plant, with a man-hole or coal chute in the clear way.

The construction desired is steel posts on 18-ft. centers for the first and second floors, steel beams, concrete floors and hollow tile curtain walls with face brick front one story high on the national pike, the building to be so constructed so that an addition can be built at any time over the courtyard, giving us the full three-story building over the entire lot. The roof of the third floor is to be also concrete and flat so that if needed, in the new building the elevator, which we would then have, would carry to the roof, giving us that additional storage space.—Hopkins Motor Co., 15th Street, Wheeling, W. Va.

We have been obliged to overrule a number of your requests, believing that our judgment in these matters is perhaps better than yours.

In the matter of placing the columns, you will note that we have not used 18-foot centers as you requested. Columns spaced in this way, while perhaps more economical from a building standpoint, would waste many times the cost because of the waste of space in placing cars between them. Columns should be spaced either in the neighborhood of 15 feet on centers, 21 feet or 26 or 27 feet, depending on whether two, three or four cars are planned to be placed between each two columns.

Another feature which we do not think would work out right is the location of the shop. If placed on the lower floor there would be practically no light except from the row of windows at the rear of the building. In view of the low ceiling on this floor, light would penetrate only a short distance and the major part of your work would have to be done by artificial light. The top floor of a



building is always considered best for a shop, as here skylights may be installed and there is always better light from the side windows. If you think it worth while, you could install a temporary shop using half the rear yard as indicated on our plan, but even if this is done the shop should be eventually moved to the upper floor when the rear section of the building is finished.

With these things in view, we would

strongly recommend that you install the shop as we have indicated so that it would not have to be moved when the building is finished, but could simply be spread over the remaining part of the upper floor.

This would leave the two lower floors for storage of new cars and parts.

We have indicated the yard floor depressed about two feet below the lower street in order to gain head room for the two lower floors.

### Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected to be.

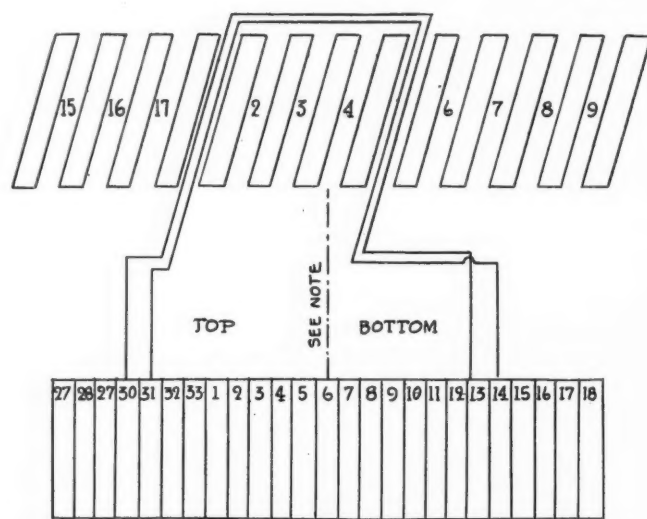
Number of cars on the sales floor.

Number of cars it is expected to garage.

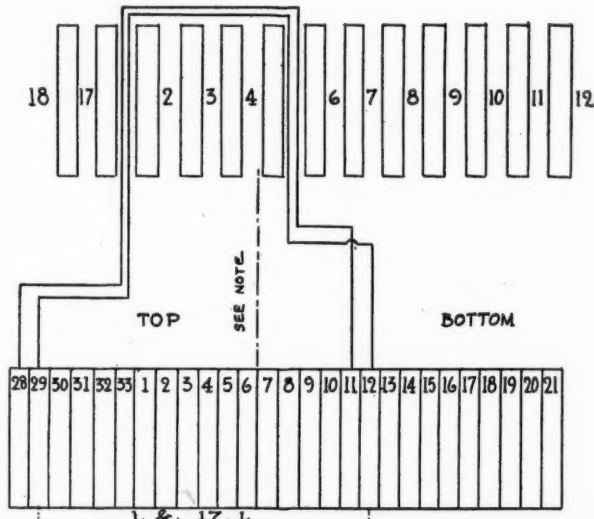
Number of men employed in repair shop.

How much of an accessory department is anticipated.

## Autolite Type G. K. Diagram



NOTE THIS DIAGRAM SHOWS THE G. K. ARMATURE WITH SLANTED SLOTS CAUTION THE DEAD COIL MUST BE IN SLOT WHERE THE SEGMENT CENTERS AS SHOWN AT DOTTED LINE. THE OTHER COIL FROM THIS SLOT THEN CONNECTS TO SEGMENT 12.



NOTE THIS DIAGRAM SHOWS THE G. K. ARMATURE WITH STRAIGHT SLOTS THOSE WITH SLANTED SLOTS IS SHOWN ON DIAGRAM AU.11. CAUTION THE DEAD COIL MUST ENTER THE SLOT WHERE THE MICA IS IN CENTER AS SHOWN BY DOTTED LINE THE OTHER COIL THAT ENTERS SAME SLOT CONNECTS TO SEG. NO. 10.

Q. I am in receipt of your letter of April 7, in regard to armature winding and wish to thank you very much for the information. I have noticed in the past, several wiring diagrams of armatures in the Motor Age, but have no diagram of the Baby Overland armature, 1920, that I can find. I would like for you to send me a diagram or blue print of the connections coils and slots of this armature. This armature seems very odd or funny to me as it has 17 slots in core and 33 segments in commutator.—J. B. Galloway, Logan Light & Power Co., Logan, N. M.

We have no diagram of the 1920 Autolite but have been informed that the 1921 is similar. The Autolite type G. K. is illustrated at Fig. 93. This generator was used on the 1921 and 1922 model Overland four. You will note that the commutator has 33 segments with 17 slots. The coil pitch is one and five. There are two coils per slot and six turns per coil of No. 17 double cotton covered wire. The connections to the commutator are one and seventeen.

The diagram shows the other data. The

generator has four poles and one dead coil, the winding to be lapped to the right. The dead coil is for balance. The armature wiring diagram of the G. K. Autolite used on some models of the small Overland is the same with the exception that the armature has slanted slots. There are 33 segments and 17 slots in the commutator. Coil pitch is one and five and there are two coils per slot with six turns per coil. The wire size is No. 17 silk covered enamel. There is one dead coil for winding balance.

## Some Varied Electrical Information

Q. Can you tell me if it would be possible to connect a six volt Hot Shot battery to the average high tension magneto breaker points through a high tension separate coil, and use it for starting engines that are equipped with high tension magnetos which have become weak? If this can be done without harm to the magneto it would greatly help in garage work where people come in, in a hurry and want their engine started. I have been afraid to try this so will appreciate any advice you could give.

This method of starting an engine has a number of disadvantages although it is possible to use it under some circumstances. A diagram is shown giving the connection. The coil used is not a high tension coil but a coil having one winding only. The type of coil used on make and break ignition for stationary engines would be suitable. When the interrupter points of the magneto close the battery sends current through the coil and due to the magnetic nature of the coil this current is highly inductive and does not stop readily when the interrupter contacts open.

For this reason at the opening of the interrupter contacts there is a sudden surge of current through the primary of the magneto. This sudden rush of current through the primary of the mag-

neto will generate a voltage in the secondary of the magneto. The difficulty encountered is due to the fact that as the armature of the magneto is rotating it also generates a little voltage of its own which for one spark will co-operate with the current from the battery while on the next spark will oppose the action of the battery current. For this reason a circuit of this kind will make every other spark stronger and every other spark weaker.

It presents the possibility, however, of starting on two cylinders and then opening the battery switch and running as a magneto only. This method also has the disadvantage that there is some tendency to further weaken the magneto. The correct procedure when a magneto is weak is to have it overhauled and re-magnetized. In other cases where a magneto is chronically weak at low speed or where the starter turns the engine

over very slowly it might be advisable to install an impulse type coupling which gives the magneto armature a quick turn even when the engine is being turned slowly.

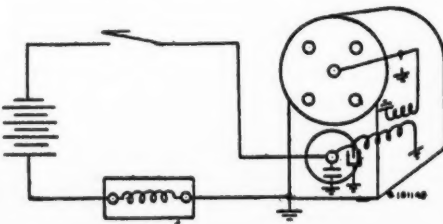
### Method of Dry Storing Storage Batteries

Q. Would like some information on how to dry store batteries.—Harold B. Bryn, Madison, Wisconsin.

1. Give the battery a complete charge. Pour out the electrolyte, and separate the groups. If the negatives have bulged active material, press them in the plate press. In batteries in which it is difficult to remove the plates from the cover, the groups need not be separated unless the negatives have badly bulged active material. It may not be necessary to separate the groups even then, provided that the positives are not buckled to any noticeable extent. If only a very slight amount of buckling exists, the entire element may be pressed by putting thin boards between the plates in place of the separators.

2. Immerse the negatives in distilled water for ten to twelve hours. If positives and negatives cannot be separated, wash each complete element in a gentle stream of water.

3. Remove plates from water and allow them to drain thoroughly and dry. The negatives will heat up when exposed





## Questions on Maryland Motor Vehicle Law

Q. Will you please answer me in the Reader's Clearing House Department of your magazine the following questions in regard to the Maryland Motor Vehicle law:

When a person applies for an operator's permit in this state he must obtain from the Commissioner of Motor Vehicles an application blank which must be signed by a licensed driver.

The question is if the person applying for a permit has an accident while driving would the instructor be responsible for the damage?

Also if the applicant takes the car out without the knowledge of the instructor and has an accident would the instructor be held responsible?—F. E. Whedbee, Seabrook, Maryland.

If a licensed driver should willfully and corruptly recommend an incompetent driver and thus secure a permit wrongfully, it is possible he might be held guilty with the incompetent driver should said incompetence result in injury to others. But one is not liable for the torts of another except in cases where there exists the relation of master and servant or principal and agent.

### Instructor Not Responsible

Then an instructor would not be responsible for another unless it could be shown that the relation of master and servant or principal and agent existed at the time of an accident. Now, if an accident occurs while the instructor and pupil are together in the car, same being driven by the pupil under the directions of the instructor, the instructor would be jointly liable as the master or the principal.

Again, where the car is taken out by the applicant without knowledge of the instructor, the question of whether the instructor might be liable for damages arising out of an accident thereby, depends on whether there is a general or implied consent on the instructor's part

to such an act of the pupil. The rule is that if the servant or agent is driving the car in furtherance of the master's or principal's business, that is, doing a duty owed to the master or principal, the master or principal, the master or principal (the instructor here) would be liable for accidents arising from the servant's negligence in operating the car.

Whether the pupil was doing something within his duties, or performing the work required by the instructor might be shown by circumstances and facts. If the driver was in performance of his duty to the instructor it would not make any difference that the instructor had no knowledge—unless the car was taken out contrary to the instructions and orders of the instructor.

One may loan his car or his plow or his knife to another, and he does not thereby become responsible for the negligence of that other in their use. So if the instructor merely loans his car to another, or hires it to him, the instructor is not thereby made liable for the latter's negligence in its use, for the relations of master and servant or principal and agent are not thereby established.

*Read the complete story of the Detroit meetings on page 9.*

## Mortgaged Truck Repaired; Seeks Attachment

Q. Will you kindly tell me the law on the following:

In case I have a truck or car come into my place that is mortgaged, for repairs and I repair the same, can I hold the car for my bill, or in case the same was in court and there was an attachment can I still hold the car for my bill?

In this particular case the attachment was placed against the truck some two years ago and through some agreement the party was allowed to use the truck until the courts settled the same and found the owner. Now really the attachment was in doubt until after I had the car in my garage and the repairs were made.—H. A. Read, Stanhope, Iowa.

The weight of judicial opinion is that the prior mortgage takes precedence over a subsequent repair man's lien for repairs made. Also where the garage-man knows there is an attachment suit pending and proceeds to make repairs on the attached car he may not complain if a court finds against his customer and such finding results in putting the car in constructive possession of another than his customer.

### Authorized to Repair Truck

Now if there was an agreement between the parties claiming right to the truck, that same might be used, I am of the opinion that you can take advantage of such fact to show that you were indirectly authorized to repair the truck by the adverse party winning in the suit. For an agreement to run and use the truck should necessarily carry with it the authority to repair, for which the truck repaired could be held. And such a claim should be presented to the court trying the attachment suit, lest an order depriving you of the property be entered by the trial court.

to the air, and when they do so they should be immersed in the water again to cool them. Repeat this as long as they tend to heat up. Then allow them to dry thoroughly.

4. Throw away the old separators. Rubber separators may be saved if in good condition. Clean cover and terminals, wash out the jars and turn the case upside down to drain out the water. Examine the box carefully. It is advisable to wash with a solution of baking soda, rinsing with water in order to neutralize as far as possible the action of acid remaining on the box. If this is not done, the acid may start decomposition of the box while in storage, in which case the owner of the battery may insist on its renewal before acceptance at the end of the storage period.

5. When the plates are perfectly dry, nest the positives and negatives together, using dry cardboard instead of separators, and replace them in the jars in their proper positions.

6. Replace the covers and vent plugs,

but, of course, do not use any sealing compound on them.

7. Tie the terminals and top connectors to the handle on the case with a wire.

### Tag Battery With Owner's Name

8. Tag the battery with the owner's name and address, using the tag on which you made the sketch of the arrangement of the terminals and top connections.

9. Store the battery in a dry place, free from dust, until called for.

10. When the battery is to be put into service again, put in new separators, put the elements in the jars, seal the covers, and burn on top connectors and terminals (if these are of the burned-on type). Fill the cells with electrolyte of about 1.310 specific gravity and allow the battery to stand for ten to twelve hours in order to cool. Then put the battery on charge at one-half the normal charging rate and charge until the specific gravity of the electrolyte stops ris-

ing and remains stationary for five hours. The total time required for this development charge will be about four days. Watch the temperature of the electrolyte carefully, and if it should rise to 110 degrees Fahrenheit stop the charge until it cools.

11. The specific gravity will fall during the first part of the charge, due to the new separators; at the end of the charge, the specific gravity should be 1.280-1.300. If it is not within these limits, adjust it by withdrawing some electrolyte with the hydrometer and adding water if the gravity is high, or 1.400 electrolyte if the gravity is low.

12. Clean the case thoroughly and give it a coat of asphaltum paint.

13. Just before putting the battery into service, give it a high rate discharge test.

**Note:** From the *Automobile Storage Battery, Its Care and Repair*, published by the American Bureau of Engineering, Chicago.

## Soldering Armatures

Q—I have discovered a new method of soldering armatures, or at least I should say it is an application of the method used by the power people in soldering their big armatures. There is one point about it that I would like to know what you have to say, that is in regard to the flux used. We have always been told not to use acid on account of its corroding the commutator. Now this man uses broken acid, that is hydrochloric acid with zinc, and claims it is then a salt and will not corrode the commutator. He states he has been using this for four years and never had a come back in that time. What do you think of this?

The soldering is done by using the following homemade apparatus. A carbon stick from the center of a dry cell is the heating element while a holder for it is made from a strip of sheet metal, fairly heavy, made up in the form of a clamp and attached to a convenient handle made of wood. The clamp which holds the carbon stick is attached by means of a wire to one terminal of a six volt battery while the other battery terminal is connected to the vise. A strip of copper is then placed around the commutator and used to clamp the armature in the vise so that in this way all of the commutator bars are connected to one of the battery terminals.

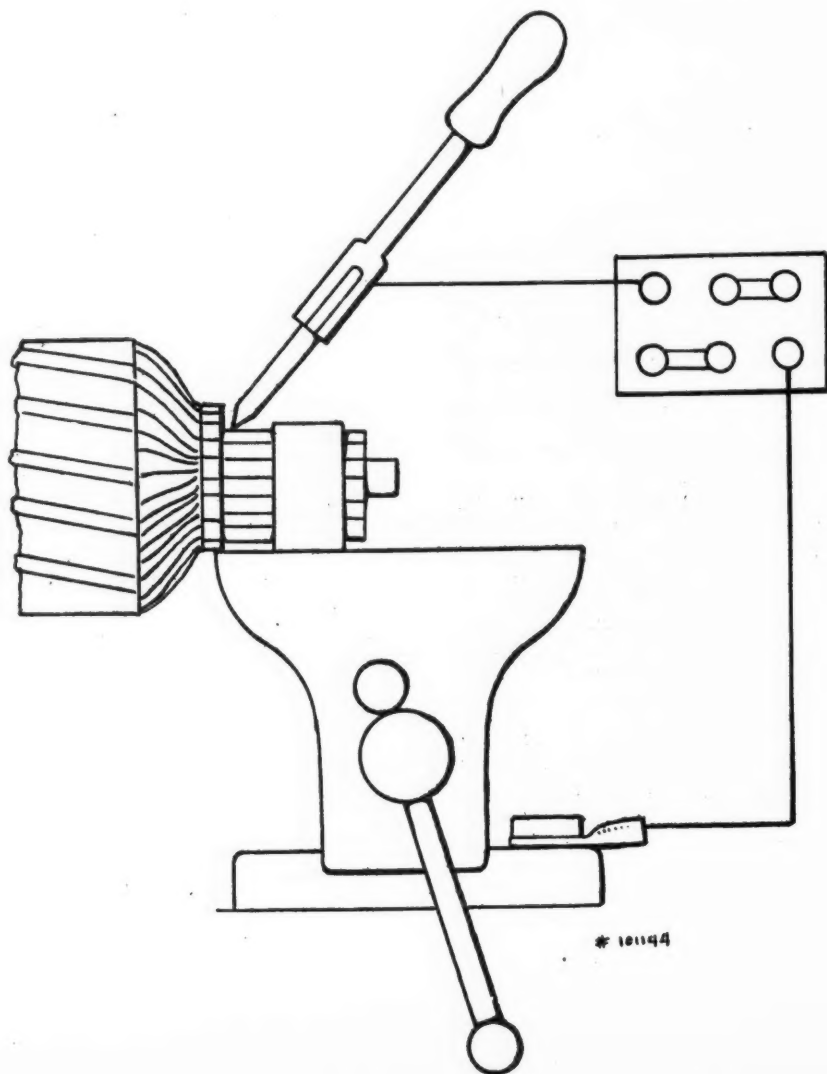
I watched a couple of Ford armatures being soldered in this manner and it sure is a time saver because there is no time lost in preparing the job or waiting for the soldering iron to heat and it is possible to control the amount of solder in a manner that is almost impossible with an iron. It appeared to me as the best idea

I have seen for this work.—D. A. Innes, Eburne, British Columbia, Canada.

The method suggested is illustrated, although the method shown is by no means new. The heat is produced by a heavy current flowing through a high resistance. The point of high resistance is the contact of the carbon with the copper segment. The best method of using a device of this sort is to apply the point of the carbon stick near the place where the solder is to be melted.

This is shown in the illustration where the point of the carbon is applied to the commutator bar. The solder may then be run into the slot in the commutator riser where the leads have been placed. In regard to the use of cut acid or hydrochloric acid in which zinc has been dissolved would say that it is not so much the corroding effect as it is the fact that this solution is a conductor of electricity.

The man in question doubtless uses the solution with considerable skill and applies only a small amount. Then considering that most of the solution is evaporated or burnt away when the soldering is done it is probable that not enough is left to cause any trouble. However, with the average mechanic it is advisable to use a flux which is not a good conductor of electricity.



## A Legal Tangle

Q. Your letter of February 10 in answer to my questions of January 26 was received.

I am very much obliged to you for your valuable information. Since then I have been informed there is another party who has a mortgage on the car to the extent of \$300. The above mentioned party who has this mortgage is a lawyer who came to me personally and told me he will take interest I get my money but that I should not proceed to sell the car because I could not do so.

Anyway I am holding the car and waiting to hear from that said party this week, as I would like to get out without going into any kind of trouble. If there is any other suggestion you could offer me in case of further proceedings, I will be very much obliged to you.—Fern Garcia, New York.

Section 184, chapter 34 of the New York statutes, lien laws, gives the repair man a lien superior to the mortgage holder. You have a right to hold the car and to sell same under proper procedure. Cite the mortgage claimant mentioned by you to this section.

## GLENWOOD PAIGE CLUTCH

Q. I have a 1915 Glenwood Paige that I use for a wreck and service car. On a hard pull the clutch gets so hot that it will not release. What type of clutch has this car, and should it be oiled? Clutch sticks so badly that it is impossible to shift gears at times.—M. A. Gaff, Churubusco, Ind.

The clutch used on the 1915 Glenwood Paige is a multiple disk cork insert clutch. This clutch is designed to run in oil and the recommended lubricant is one pint of a solution of two-thirds kerosene and one-third medium or light cylinder oil. Without a doubt the continued slipping of the clutch has worn off the cork inserts and the clutch is taking its drive from the steel plates themselves. It will be necessary for you to secure new clutch cork inserts and if the discs themselves have been scratched or scored we would recommend installation of new ones. There is no adjustment to this clutch other than keeping the clutch pedal about one inch away from the floor board.

## HORSE REGULATIONS

Q. It has come to our attention that there are certain states and cities in the United States that prohibit horses from using their streets. Will you please advise regarding this?—Rosentour Motor Co., Passaic, N. J.

In the regulation of traffic on certain streets, for convenience, safety and to expedite traffic, most large cities have ordinances limiting the use of horses and horse-drawn vehicles upon certain streets as named. This is a police regulation coming under the police powers of the state usually delegated to the cities, and one would have to search the ordinances of any particular city to see to what extent, if any, horses are prohibited from using certain streets.

For instance, along the north shore and Lincoln park in Chicago a cinder road is especially provided for horse riding, and it would be negligence per se for a horse-back rider to ride on the boulevard as violating an ordinance.



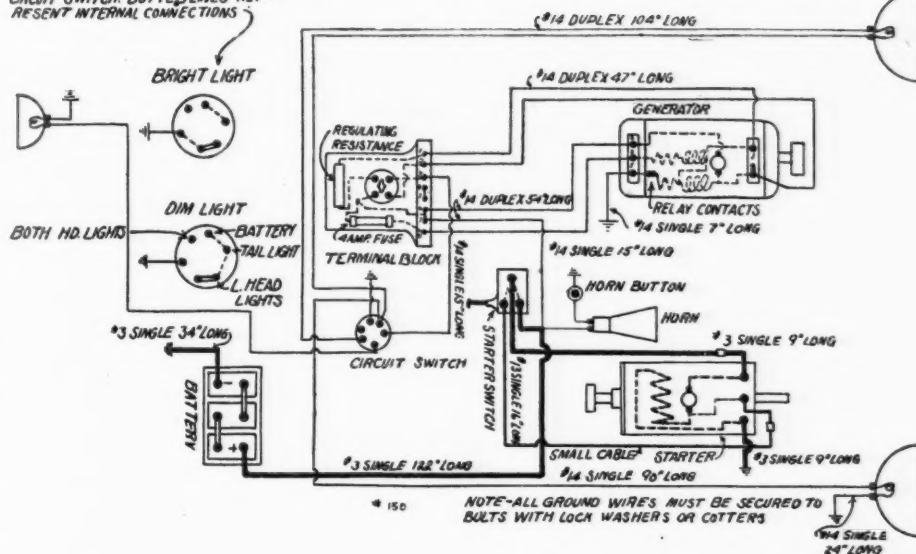
## Some Data on an Old Regal

Q. Let us know the year model, gear ratio and other data of the Regal under-slung car with Rushmore starter and generator (separate units) Remy ignition. 32x3 1/4-inch tires. Also where will I find the motor number of this car? I believe it is either a 1913 or 1914 model. Indiana Inquirer.

We regret to state that serial numbers of the various model Regal cars were not supplied by the Regal company and we are therefore unable to tell you the exact year of manufacture but judging from the specifications it appears to be a 1914 model N. None of the Regal cars, according to our specifications, carried a Remy magneto, the equipment for all years being divided between the various battery systems and the Michigan and Bosch magneto.

The following are specifications of the Regal model T, model N and NC. Four cylinders, 3 3/4 by 4 1/2 inch bore and stroke. S. A. E. rating, 22 1/2 h.p. Cubic inch piston displacement, 198 and 8/10. Camshaft drive, Helical gears. Cooling circulation, thermo syphon. Lubrication system, splash pressure. Type of oil pump, plunger. Ignition system, dual make, Michigan magneto. Make of carbureter, Schebler. Lighting system, Rushmore. Clutch type, cone. Final drive, bevel gear. The wheel base is

SKETCH SHOWING FRONT VIEW OF LIGHT CIRCUIT SWITCH. DOTTED LINES REPRESENT INTERNAL CONNECTIONS



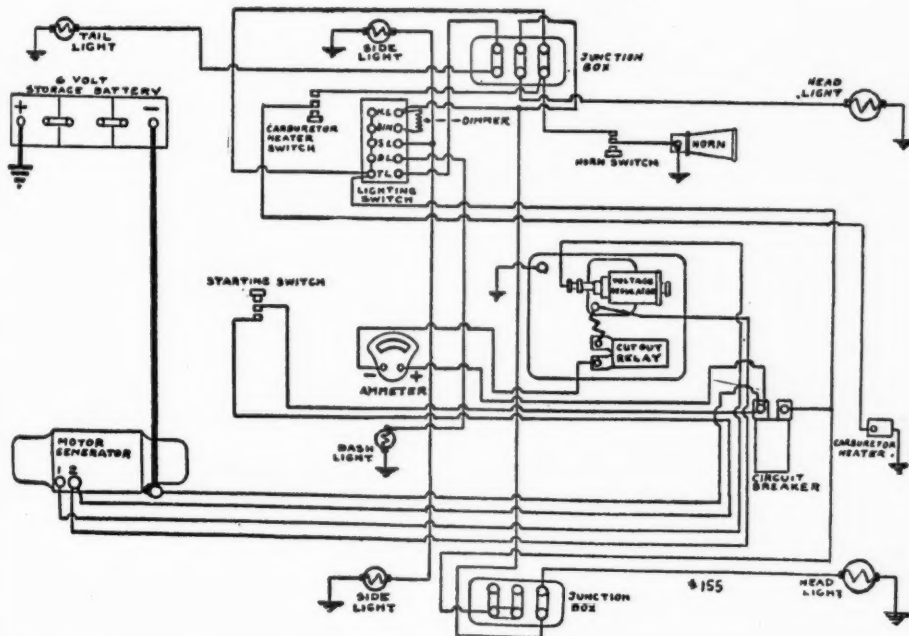
108 inches and the tires 32 by 3 1/4 inches with one-half elliptic springs and a two bearing crankshaft on the engine.

Q. Publish wiring diagram of this car and also oiling system for this car. What is the probable speed with everything in good shape?

We regret to state that we do not have any illustration of the engine oiling system although wiring diagram is furnished. You will note that the wiring is

for the starting and lighting system and should you have any difficulty in wiring, communicate with us and we shall make every effort to supply the necessary information. The brake h.p. of the model N engine is 32 h.p. at 1600 revolutions per minute. Judging from this h.p. and the gear ratio it should be possible to secure about 50 to 55 miles per hour on this car with everything in good shape.

## Stevens-Duryea Wiring



Q—Will you kindly send or publish a wiring diagram of 1915 model D. D. (7 passenger touring car) Stevens-Duryea? —Schnure Motor Co., 2938 Olive Street, St. Louis, Mo.

The diagram requested is shown at Fig. 155. As this system incorporates the Mercury type of regulator for generator output we would suggest that if any trouble is encountered that it be changed over to a manual type or a new vibration type regulator. The wiring diagram showing how the voltage regulator of the

Mercury type may be discarded and the manual control used has been printed in MOTOR AGE several times in the last three months.

If it is desired to have an automatic regulation by discarding the Mercury regulator it is advised that you send the generator to a Delco service station where reverse series field winding will be installed and vibrating type used instead of the present Mercury outfit.

## HAYNES ENGINE IN NASH

Q. I have installed a Haynes light 12 motor in a 1918 Nash but when I started it for the first time since I received it from the factory I find I cannot make it fire on the four center cylinders of the right block. Numbers 1 and 6 fire O. K. I have checked over the ignition and get a spark at each plug. The valve tappets seem to be all right and the motor has run five hours but it is still impossible to turn it with the starter and crank so I cannot tell how the compression is. We pull it with a truck to start it. Have also changed plugs. Do you think the valves could be out of time or leaking? Any suggestions would be appreciated. I have had eight years' experience but I must say this motor seems to have the best of me. I do not like to remove the cylinder head unless I am sure where to find the trouble.—Charles Abbott, Canton, Minn.

It is difficult for us to give an accurate diagnosis because of the fact that we do not know whether or not you have compression on the four cylinders mentioned. Our suggestion is that you check the firing order, which should be as follows: One right, six left, four right, three left, two right, five left, six right, one left, three right, four left, five right, two left.

It would be well to check the secondary wires running from the distributor to the spark plug against this firing order, and allow the engine to run until it is sufficiently limbered up to allow cranking. If there is no compression after the engine is limbered up, check the firing order, ignition timing and valve timing and we would suggest that you remove the head and examine the internals from above. If there is no compression the cure will be obvious.

(Continued from page 18)

James Granger of the Southern California Automotive Trade Association declared the members of his organization have turned definitely to maintenance as holding forth the greatest opportunity for profit in the future. They realize, he said, that maintenance represents by far the greatest volume of business in the automotive industry in the future and that only by developing their maintenance departments will they be able to profit as they should. He declared too many new cars have been sold and that

the turnover in dealers has been too great.

Robert E. Lee of St. Louis said one of the valuable activities of his association was the keeping of a record of salesmen employed in the city. This record is at the service of members to whom salesmen apply for employment.

#### Greatest Profit Opportunity

C. A. Baird, manager of the Youngstown (O.) association, told of a school in salesmanship conducted by his organization with very satisfactory results. This

school was for men already engaged in selling automobiles.

The new merchandising film of the Automotive Equipment Association, "Profitable Maintenance," was exhibited to the conference by Arthur R. Mogge, merchandising director of the A. E. A.

A short talk was made by Charles B. Warren of New York City, vice-president of the N. A. D. A. Mr. Warren emphasized the importance of associations as an aid to better business for automotive dealers

## U. S. Exchanges Automotive Ideas With World

THE automobile has become a citizen of the world. Its benefits are claimed by people of every race and color and the profits to be derived from its distribution are going into the pockets of able merchants in every foreign land as well as in the United States. The vital part now being taken by the automobile in the business and social life of the world was strikingly visualized when about 150 delegates representing 54 countries gathered in Detroit May 21-24 for the first World Motor Transport Congress held under the auspices of the National Automobile Chamber of Commerce.

The Americans who were hosts to this assembly of foreign automotive men got a vivid, first-hand picture of the problems facing the development of motor transport in other countries and a new conception of the size and extent of the automobile business. Englishmen, Australians and South Africans, tall in figure and broad in a's, told about the widespread use of American cars and trucks in their countries and outlined the kind of difficulties they are meeting in merchandising and selling. Dusky-hued Egyptians and Jamaicans showed how the motor truck is facilitating the transport of goods in their homelands and how the passenger car is becoming an integral part of their social and economic life. Scandinavians, Teutons, Orientals, Latin-Americans and natives of many other climes all contributed ideas and took away information designed to give impetus to the sale and use of motor vehicles.

#### Problems Are the Same

Study of the questions presented by this varied group of delegates shows that the problems of the automotive dealer are much the same, whether he speaks English, Spanish, German, French or Esperanto.

"How can I make 5 per cent net profit?" is just as hard to answer in one tongue as in another. If there is anything to choose, the facts brought out at this meeting indicate that it has been answered in plain American somewhat better than in any other language.

As regards financing retail sales, for example, the American dealer is in a better position than most of his foreign brothers, especially in handling American-built products. In Australia, to be sure, local finance corporations have

been started within the last few years and are helping materially to increase the sales of cars in that territory this year. But, taken by and large, handling of retail automobile paper is being taken care of relatively well in the United States. A large proportion of the foreign visitors were much interested in the presentation of American financing methods made by A. R. Erskine, president, Studebaker Corp., C. C. Cooper, president, General Motors Acceptance Corp., and others.

As well as giving a general picture of finance company operations, Mr. Cooper outlined certain phases of the activities of these corporations which have not been thoroughly understood by some American dealers. Discussing the topic, "Methods of Financing Retail Sales of Motor Vehicles," Mr. Cooper said time payment sales of motor vehicles when properly handled are a logical and desirable development of the business.

The interest with which the visiting dealers listened to a typically American talk on "Effective Automotive Advertising," by Edward S. Jordan, president, Jordan Motor Car Co., and the number of them who commented on it afterwards indicates that the fundamentals of selling can be transferred across national boundary lines without much change. One delegate from the British island of Jamaica was so impressed with Mr. Jordan's presentation that he stopped him before he could leave the room and presented an inviting looking cigar to him with the remark: "I'm sorry I can't give you a bottle of Jamaica rum, Mr. Jordan, but I can give you a Jamaica cigar."

When F. J. Haynes, president of Dodge Bros., told the convention that dealer-manufacturer relations must rest basically on honesty and fair dealing, his remarks certainly were universal in their application. Mr. Haynes said in part:

"It is only natural that manufacturers, to be successful, should choose their retail merchants, or as we call them—dealers, with extreme care and deliberation.

#### Three Merchandizing Factors

"In selecting a field merchandizing organization, it is plain that the determining factors should be—

First: A reputation for straightforward and honest business dealings,

Second: Sound business experience, and

Third: Adequate financial strength.

"Financial responsibility is placed last, because if a man has ability and a splendid reputation for honesty in the community, financial support will be forthcoming to him from many sources.

"In no case should there be any compromise on these essentials.

"The manufacturer should never lose sight of the welfare of his dealers. This should be reflected in the design of his product, and should be based on the belief that the most successful product is always born of careful study and gradual evolution, rather than by radical changes.

"Necessary changes or improvements should be made at no set time, but whenever needed. The policy of constant refinement without too radical changes of design will tremendously enhance the earning power of the dealer. He should be given a product with a standard of value, as sure and irrevocable as the standard of a Government Bond.

**"The dealer should, for himself, accurately ascertain whether his manufacturer is financially sound. Whether he has so conducted his affairs that he is able to, in times of grave financial depression and during rehabilitation periods, stand the strain."**

"But these are business platitudes well known to all you gentlemen, and are incumbent alike on all who hope to succeed."

#### Suggestions Passed Along

Besides the sessions on selling and finance, the meetings were devoted chiefly to giving the foreign dealers a clear picture of how America has achieved its present stage of automotive development, what problems have been met, and how they have been solved, the idea being for these men to carry back with them information which would help the automotive trade in their own countries to profit by the experience of the United States. This was the thought behind the sessions on general automobile and truck development and on motor buses and taxicabs.

The same general idea dominated the three meetings devoted respectively to highways, legislation and trade association activities.



# SQUEEKS & RATTLES

**S**PEEDING," says a well known European writer, "has become such a fashion with Americans that the man who does not own a car is in constant danger of being run down."

This writer stood at a corner in New York for half an hour, he says, and didn't once get a chance to even make a break at crossing the street. A mis-step would have meant his first lesson on a harp.

Speeding, in fact, has become an obsession with Americans. The European writer is right—the only way to live long is to buy a car and race as fast as you can every time you get in.

Just release the brake, shove in the clutch, close your eyes and step on it. Laws were made to be broken anyway, so go ahead and break 'em.

Besides, if people didn't break laws, just think of the army of policemen who would be thrown out of jobs all over the country.

It used to be that an "apple a day kept the doctor away." Now it's a "race a day will keep everybody away and he that doesn't keep away will be put away."

Don't even pretend to be sane when you're in an automobile—dealers especially. When you almost run over a guy, he'll realize that he needs a car to get around in and he'll probably come over and buy it from you.

The complete transportation store of the future will combine not only a sales and service station but also a first aid station.

The day is not far off when no accessory display will be complete without a line of coffins.

An interesting side line for dissatisfied service managers to take up would be that of embalming—there's going to be a lot of money in it before long.

Why turn over all of the business to an undertaker? Get in on it yourself.

Or better still, support the people who are trying their damndest to put a stop to his crazy "fashion of Americans." It'll pay better in the long run.

## A Sure Thing

The automobile always beats the train to the crossing, barring accidents.—*Detroit News*.

## Injured Dignity

"Does you still refuse, sah, to pay me dem two dollars ah done loaned you'n, de Lawd on'y knows when?"

"Nussah!" dignifiedly replied Brother Bogus. "Ah doesn't refuse. Ah jes' refrains."—*More Pep*.

## Boats That Pass in the Night

Here in the lazy twilight, with the sun still pink in the west;

Here where the birds sing an evening song, to the tired soul seeking rest;

Here, in the dreamy shadows, where all things seem so good—

Here is where the night time takes me back to the old neighborhood.

For all is peaceful and silent, all but the cooling breeze, Making a path for the moonbeams, through the long, black arms of the trees.

But now comes a horrible howling, a pulling as if in low, Some boob was trying to make the hill at fifty miles or so.

Then all is quiet again for a while and a great red moon looks down,

And smiles on forest and field alike, clothing them both in her gown.

But now comes a rumble and roar from the East, like the Huns sweeping down from the North—

What ho! 'Tis a guy in an Overland with two of his cylinders scorched.

And now, as the night advances, a coyote cries from afar, 'Tis a long, low wail of sorrow—coyote, hell! It's a car! Then with a squeak and rattle, a bang and a war-like whoop,

A car crawls up—no lights on it, but it sounds like a Packard coupe.

Again we turn to our dreaming of peaceful and quiet things,

While down the road the night bird raises its voice and sings.

Nearer and nearer the singing, till now its a series of howls—

Making a country church choir of the chorus of screeching owls.

And so, all is quiet and peaceful, out here where the West starts in

Save for the cars that are crippled in the holiday's horrible din.

These are the joys of riding, of trying to keep to the right—

These are the boats that are passing—passing in the night.

## A Smash

She was innocent! Jack had taken her riding in his car and just as he kissed her a tire blew out.

"Oh, Jack," she murmured. "How lucky that we didn't stay at home! Father is such a light sleeper."

—LEW BRICATION.

# BOOSTING ACCESSORY SALES

**S**PRING with the approach of the touring season affords to the progressive transportation merchant a golden opportunity. The automotive establishment that is alive to the needs of vacationists can cash in handsomely by supplying accessories for the car. Many new and worth-while products are now on the market and they are of such a character that they not only add to the pleasure of motoring but are actually needed by car owners who give a thought to efficiency and economy of operation. Sell them on this idea and cash in.

## Automatic Spring Lubricator

Spring lubrication on the lamp wick principle is the feature of an automatic oiling device which has made its appearance. It is designed to afford a continuous supply of oil, distribution of which is obtained through capillary action. The oiler consists of a band of felt 2 in. wide and about 1/4 in. thick, to which is attached an outer band of very pliable zinc 1 1/2 in. wide. The zinc and felt bands are held together by metal switching and wrapped around the spring and fastened with a clinched tack. To obtain efficient spring lubrication the producer recommends that the felt be soaked with engine oil about once a month. R. & C. Manufacturing Co., Parkersburg, W. Va., are the makers. Prices vary, according to the car to be equipped. The list price is 5 cents per inch.

## Aluminum Step Plate

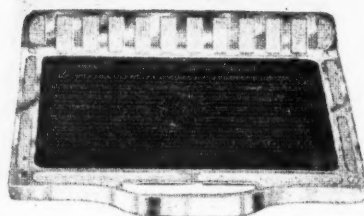
Motorists looking for step plates are asked to consider a pure aluminum step plate complete with kick plate and foot scraper produced by the Ohio Paris Co., 3307 Colerain avenue, Cincinnati. The size of the frame over all is 11 3/4 x 9 3/4 in.; the weight of the frame is 13 ozs. The list price is \$1.67 each and black rubber mats sell at 33 cents each. The company makes various types of step plates.

## Make Governor for Fordson

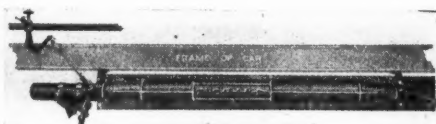
Reduction in service costs through the provision of uniform speed at all times regardless of change in drawbar pull is the aim of the manufacturer of the Taco governor for Fordsons. The purpose of the governor is to reduce the fuel supply the instant the load is decreased and still maintain the speed of the motor so that as soon as the plows are lowered and the load increases, full power is instantly given, without any slack in speed.

The Taco Model "B2" Flyball Governor is an entirely enclosed job that connects directly to the Fordson throttle valve without changes. It fits into the recess occupied by the timer, being raised and applied to the top of the governor. The governor is driven off the camshaft of the motor, through a single set of heavy steel cut gears which are lubricated by means of a grease cup.

The governor is of the gear driven fly-



Aluminum step plate



Muffler for Chevrolets

ball type. Moving parts are mounted on ball bearings in order to do away with friction or binding. The roller of the timer is mounted on a bushing, which, it is said, when once set, need not be changed when renewing timer roller. A timer control lever is also provided as part of the governor.

Provision is made for setting motor speed by means of a thumb screw on the spring housing of the governor. Higher or lower speeds, other than governor speeds, are intended to be obtained by using the regular Fordson hand throttle. The Taco governor has a timing feature, and, it is asserted, when the roller of timer is changed, the operator cannot get the tractor out of time.

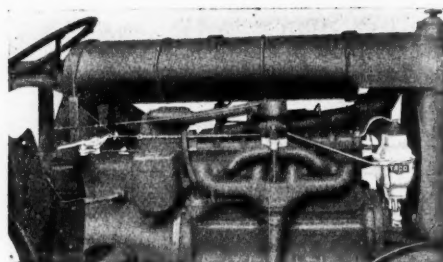
Model "A" is equipped with ball bearing throttle valve and is designed to fit the Fordson tractor with either the new or old style manifold. When the Fordson is equipped with the Model "A" the governor cannot be cut out; however, on the model "BB" the governor can be cut out entirely by shifting the throttle lever past the governing speed.

These governors are manufactured by the Tractor Appliance Co., New Holstein, Wis.

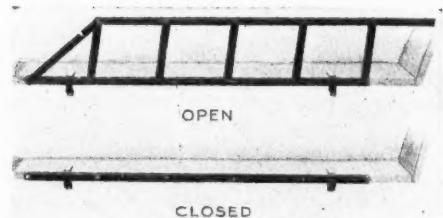
## Foldaway Luggage Carrier.

Among the things claimed for the Foldaway all-steel luggage carrier are that it will lock one-half open as well as full height; that it cannot collapse while in an upright position; that it requires no holes in the running board, being fastened either by means of thumb screws or invisible bolt screws; that it does not rattle or squeak and that it permits the opening of the car door when the carrier is opened full size and folds level with the running board when not in use. It is made in 44-in. and 52-in. sizes by the Jamestown Specialty Co., 614 Wellman Bldg., Jamestown, N. Y.

This company also manufactures the Jamestown Inside Mirror together with



Taco governor for Fordson



Foldaway luggage carrier

brackets to fit different types of cars. The mirror comes in two sizes—2 5/8 x 8 in. and 2 1/4 x 7 in. It is designed for attachment to open or closed cars—to the windshield or the frames above it, and because of the type of fastenings used can be placed at any angle to suit the driver. It is assembled and packed in individual boxes.

## Muffler for Chevrolets

A special muffler for Chevrolets, of small diameter and 40 in. in length, is designed for the benefit of drivers of that car. With a view to affording more road and body clearance, the muffler has been curved downward and it discharges the exhaust under the rear axle, which it is claimed prevents the exhaust from entering the car. Special attention has been given to eliminating back pressure in order to allow the motor to develop all the speed and power it is capable of producing.

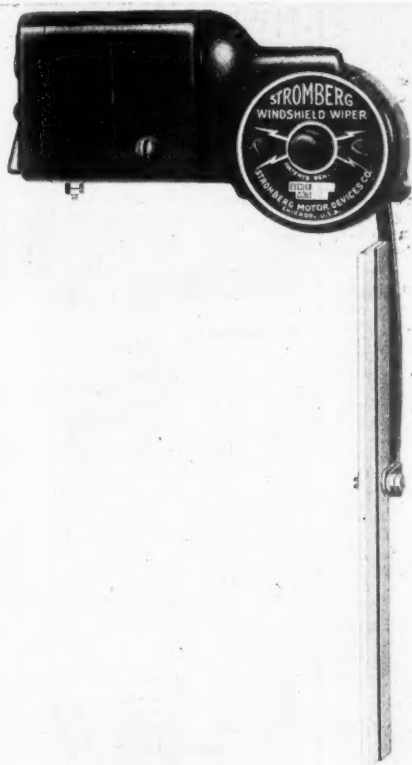
The muffler also is furnished with a combined safety relief and muffler cutout valve designed to save the muffler from excessive strain in case of explosions from unburned gases. The outfit consists of muffler with cutout attached, standard push-type locking pedal, cable of suitable length with clips and pulley.

The manufacturer is Gray-Hawley Manufacturing Co., 3123 E. Jefferson avenue, Detroit, Mich. The price of the muffler alone is \$2.25; with the cutout arrangement it is \$5.

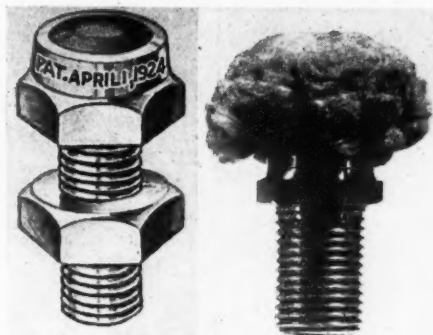
Either of these mufflers can be furnished with outlet arranged to take a separate flexible tail pipe, which permits carrying exhaust over the rear axle and discharging it at the extreme rear of the car. Flexible tubing for this purpose is supplied together with hanger bracket to support the tail pipe. This is especially recommended by the manufacturer for closed cars. The price is \$1.75 additional.



# BOOSTING ACCESSORY SALES



*Stromberg windshield wiper*



*Fabroid Tappe adjusting screws*



*New Icy-Hot Products*

## Makes New Spare Tire Lock

The Oakes Co., Indianapolis, Ind., has announced a new spare tire lock to be known as Type "AO," for installation on all Willys-Knight and Overland cars with the exception of the Overland Champion. (An Oakes Spare Tire Lock suitable for this model has been on the market several months.)

The new lock follows in general principle the design of all Oakes locks. The housing is malleable iron casting, claimed to be unbreakable, finished in black enamel. The locking unit consists of a four-pin tumbler.

This company's locks are of three general types, one for spare tires and two for spare wheels. Of the latter one is the ordinary cylinder type finished in black enamel and the other a nicked bar-arm type.

## Emergency Gas Can

Production of an emergency gas can designed to afford easy access to the intake gasoline ports of all cars is announced by its manufacturer as a remedy for the troubles of the motorist who runs out of fuel at a greater or less distance from a garage or filling station. It is constructed from galvanized iron and its capacity is two gallons.

A flexible tube is provided for insertion into the gasoline port. The can has a handle in the center of its top. One end of the tube is screwed into an opening in the top of the can, and the free end of the tube can be inserted in

another opening in the can, thus making it possible to carry the can without spilling the contents. The manufacturer is the Brookins Manufacturing Co., Ludlow and Bayard streets, Dayton, O.

## Fabroil Tappe Adjusting Screws

Absolute silence at the valve tappets is stated to be the result when Fabroil Silent Tappet Adjusting Screws are installed. This device, which is the product of John C. Hoof and Co., combines the adjustable features of the ordinary steel valve tappet adjusting screw with a slightly resilient contact surface which is made of Fabroil and pressed into a cupped recess in the head. Fabroil is similar in structure to Textolite timing gears consisting of compressed cotton fibres and a hard binder. In this case of the plug in the head of this adjusting screw, the fibres extend horizontally and are highly compressed.

The material shows a hardness of 60 and has sufficient resiliency to eliminate any noise due to impact. Fabroil is the development of the General Electric Co. and its application to the head of tappet adjusting screws is made under a license to John C. Hoof & Co., 159 W. Illinois street, Chicago.

## New Icy-Hot Products

Two new products have been put on the market by The Icy-Hot Bottle Co. of Cincinnati, O. One of these is the Icy-Hot Crock made in the one gallon size. This is an insulated container made from the most efficient insulating

materials known. It keeps its contents cold without ice, or hot without fire. It holds eight times as much as a pint bottle.

The extra wide mouth is about one inch larger than the opening of similar containers. The large cover which fits over the mouth is made of nickel plated brass, and it is held in place by two lever locks. Just turn these, and the cup is on or off in an instant.

The other new Icy-Hot product is the Icy-Hot Gallon Vacuum Jar. This is not an insulated container but is an all vacuum product, just like the regular type Icy-Hot Bottle. The inner glass filler is made of a special kind of glass which enables the manufacturer to produce an exceptionally high degree of vacuum efficiency. The filler is thoroughly protected against breakage, and is contained in a metal case, handsomely finished in black enamel with nickel plated trimmings.

## Stromberg Electric Windshield Wiper

The Stromberg Motor Devices Co., 56-68 East 25th street, Chicago, have just announced a windshield wiper which operates electrically from the storage battery.

A high degree of efficiency is claimed due to the use of a high-speed series-type motor which gives high starting and stalling torque with an actual current consumption of 1.5 amperes.

An unusually simple drive mechanism is used, the only gearing of which consists of a worm and a worm wheel. A pin on the worm wheel engages a cam which drives the wiper arm on its forward movement. At the end of the forward movement, the pin leaves the forward driving cam and engages a reverse cam, which drives the wiper on its return stroke. Thus, with few moving parts a steady back-and-forth wiping action is obtained which effectively removes sleet, snow, rain or mist from the windshield.

A continuous operation is claimed regardless of engine speeds or road conditions. The unit will also operate, if desired, while the car is "parked," the electric current being controlled by a positive and convenient switch from the driver's seat. The retail price is \$9.00.

## Liquid Soap for Washing Cars

The Quik Suds Soap Co. of Cambridge, Mass., will exhibit a liquid soap which when mixed with a good stream of cold water forms a body of soft, yet powerful, suds which it is claimed will not harm the finest varnish and may be used on leather and brass. This compound is neutral and contains no free alkali. In this way the film of grit on the car is loosened so that the hard rubbing ordinarily required is avoided and the varnish is left free from fine circular scratches so often noticed, especially on new cars.

# Prices and Weights of Current Passenger Car Models

Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price		
AMERICAN					CHANDLER					DUESENBERG					HATFIELD						
"D-46"					SS					St "8"					"6-55"						
2985	2-p		Roadster	\$1,950	2945	2-p		Roadster	\$1,695	3200	2-p		Roadster	\$6,500		4-p		Coupe	\$2,175		
3175	4-p		Sp. Roadster	2,050	3130	4-p		Roadster	1,685	3550	5-p		Phaeton	6,250		5-p		Sedan	2,350		
3260	5-p		Touring	1,695	3160	5-p		Touring	1,485	3750	7-p		Phaeton	6,750	HAYNES						
	5-p		Sport	1,850	3218	7-p		Touring	1,635	3750	4-p		Sp. Phaeton	6,500	"60"						
3310	7-p		Touring	1,760	3250	4-p		Royal Dispatch	1,785	4000	4-p		Coupe	7,500	3520	3-p		Sp. Roadster	\$1,545		
3190	4-p		Sp. Touring	1,885		5-p		Sedan	1,895	4350	7-p		Sedan	7,800	3790	5-p		Touring	1,545		
3470	7-p		Sedan	2,550		5-p		Spec. Sedan	1,845	DU PONT					3790	5-p		Sedan	2,045		
3310	5-p		Brougham	2,195		5-p		Spec. Sedan	1,845	"C"						5-p		Brougham 4 d.	2,045		
ANDERSON						5-p		Sedan	1,995	3300	2-p		Roadster	\$1,990	HUDSON						
			"41"			7-p		Sedan	2,095	3375	5-p		Touring	1,990	"Super Six"						
2650	5-p		Touring	\$1,295	3600	7-p		Sedan	2,385	3700	5-p		Touring Sedan	2,950	3300	4-p		Speedster	\$1,425		
2675	4-p		Sp. Touring	1,445	3380	5-p		Chummy Sedan	1,745	3700	5-p		Suburban Sedan	2,950	3425	7-p		Phaeton	1,500		
2925	2-p		Coupe	1,425	3480	5-p		Metro. Sedan	2,095	3700	5-p		Sedan	2,950	3450	5-p		Coach	1,550		
2725	4-p		Coach	1,495	CHEVROLET									3590	5-p		Sedan	2,145			
2875	5-p		Sedan	1,695	"Superior"									3675	7-p		Sedan	2,145			
2925	5-p		Sp. Sedan	1,895	1715	2-p		Sup. Roadster	\$495	2235	2-p		Roadster	\$1,040	HUPMOBILE						
			Brougham 3 d.	1,595	1795	5-p		Sup. Touring	510	2325	5-p		Touring	890	"R"						
			"50"			5-p		Phaeton De Luxe	640	2395	5-p		Touring F.W.B.	940	2650	2-p		Roadster	\$1,175		
2975	7-p		Touring	1,595		4-p		Sup. Coupe	725	2495	5-p		Sp. Touring	1,090	2700	2-p		Spec. Roadster	1,195		
APPERSON					1915	2-p		Sup. Utility Coupe	640	2405	2-p		Business Coupe	1,035	2705	5-p		Touring	1,175		
			"6"		2095	5-p		Sup. Sedan	795	2605	5-p		Sedan	1,365	2770	5-p		Spec. Touring	1,195		
2915	5-p		Phaeton	\$1,395	CHRYSLER									2800	3-p		Coupe	1,415			
2965	5-p		Sp. Phaeton	1,600	2600	4-p		Roadster	\$1,525	2560	5-p		Touring	\$995	2925	4-p		Coupe	1,595		
3400	5-p		Sedan	1,995	2650	5-p		Touring	1,335	2585	5-p		Demi Sp. Touring	1,095	2975	5-p		Sedan	1,750		
3450	5-p		Sp. Sedan	2,195	2650	5-p		Phaeton	1,395	2641	5-p		Sportster	1,195	2875	5-p		Club Sedan	1,425		
			"8"		2650	5-p		Std. Sedan	1,625	2900	5-p		Sedan	1,425	JEWETT						
4100	5-p		Phaeton	2,485	2915	5-p		Spec. Sedan	1,895	2981	5-p		Sp. Sedan	1,625	2460	2-p		Roadster	\$1,165		
4315	7-p		Phaeton	2,535	2855	5-p		Brougham	1,795	2779	5-p		Brougham 3 d.	1,265	2690	5-p		Touring	1,065		
4440	5-p		Sedan	3,485	CLEVELAND									2829	5-p		Sp. Brough. 3 d.	1,395			
4555	7-p		Sedan	3,585	2540	3-p		Roadster	\$1,085	2600	5-p		Demi Sp. Tour.	1,220	2810	5-p		Spec. Touring	1,220		
AUBURN					2645	5-p		Touring	1,045	2690	5-p		Sp. Touring	1,420	2880	5-p		Sedan	1,495		
			"6-43"		2680	5-p		Touring DeLuxe	1,145	2900	5-p		Sedan	1,650	3095	5-p		Spec. Sedan	1,695		
2642	5-p		Touring	\$1,095	2627	3-p		Coupe	1,245	2981	5-p		Sp. Sedan	1,850	2775	5-p		Brougham	1,325		
2685	5-p		Special Touring	1,295	2717	5-p		Sedan 2 door	1,295	2779	5-p		Brougham	1,490	JORDAN						
2850	5-p		Sp. Touring	1,365	2910	5-p		Spec. Sedan 2 d.	1,395	2829	5-p		Sp. Brougham	1,620	(120 in. W. B.)						
2830	5-p		Coupe Touring	1,595	2922	5-p		Sedan 4 door	1,395	2007	5-p		Touring	1,395	2890	2-p		Playboy Road.	\$1,850		
2946	5-p		English Coach	1,845				Spec. Sedan 4 d.	1,495	3250	5-p		Demi-Sport	1,495	2935	5-p		Touring	1,775		
2885	5-p		Sedan	1,695	COLE MASTER									3300	5-p		Sportster	1,595			
			"6-63"		3695	4-p		Volante Touring	\$2,175	3380	5-p		Sedan	1,995	3310	5-p		Brougham 4 d.	2,385		
3165	5-p		Touring	1,695	3765	7-p		West. Tour.	2,175	3675	5-p		Sp. Sedan	2,195	3250	4-p		Victoria	2,385		
3375	5-p		Sp. Touring	1,935	3695	4-p		Aero-Volante	2,475	3380	4-p		Brougham	1,995	(124 1/2 in. W. B.)						
3620	5-p		Sedan	2,445	3890	4-p		Imperial Coupe	2,750	3675	5-p		Sp. Sedan	2,195	3125	4-p		Blueboy Touring	2,095		
3700	5-p		Brougham	2,245	3950	5-p		Brouette Sedan	3,075	3380	4-p		Brougham	1,995	3525	5-p		Sedan	2,585		
BARLEY					4090	7-p		Royal Sedan	3,075	ELGIN					3450	7-p		Sedan	2,785		
			"6"		4150	7-p		Royal Limousine	3,175	2940	4-p		Sportsman	\$1,895	KING						
2750	5-p		Touring	\$1,395	COLUMBIA							2985	3-p		Coupe	2,145	(120 in. W. B.)				
2800	5-p		Sp. Touring	1,495	2460	5-p		Touring	\$1,095	3250	5-p		Sedan	2,345	3428	2-p		Sportster	\$1,895		
3100	5-p		Sedan	1,850	2460	5-p		Spec. Touring	1,195	ESSEX					3428	4-p		Foursome	1,595		
3150	5-p		Sp. Sedan	2,250		2-p		Coupe	1,295	2130	5-p		Touring	\$850	3528	5-p		Touring	1,595		
BUICK					2810	5-p		Sedan	1,775	2305	5-p		Coach	975	3645	3-p		Coupe	2,200		
			"4"		CUNNINGHAM									3875	5-p		Sedan	2,400			
2570	2-p		Roadster	\$935				<b>"V-4"</b>		FLINT				3400	5-p		Road King Sedan	1,495			
2680	5-p		Touring	965		7-p		Touring	\$6,300	3000	3-p		Sp. Roadster	\$1,630		4-p		Sedanette	1,995		
2845	4-p		Coupe	1,395		4-p		Sp. Touring	5,800	3200	4-p		Touring	1,395	(124 in. W. B.)						
2955	5-p		Sedan	1,495		4-p		Coupe	7,150	3575	4-p		Coupe	2,095	3428	2-p		Sportster	1,995		
			"6"			6-p		Sedan	7,650				<b>"6-60"</b>		3428	4-p		Foursome	1,795		
3300	2-p		Roadster	1,275	DAGMAR									3528	7-p		Touring	1,795			
3455	5-p		Touring	1,295				<b>"6-70"</b>		5-p		Touring	980	3645	4-p		Coupe	2,400			
3845	5-p		Sedan	2,095	3800	4-p		Sp. Touring	\$3,500	FORD					3875	7-p		Sedan	2,625		
3675	5-p		Dbl. Serv. Sedan	1,695	4200	4-p		Sedan	4,500				<b>"40"</b>		3400	7-p		Road King Sedan	1,795		
			"6"					<b>"V-4"</b>		5-p		Touring			5-p		Sedanette	2,295			
3470	3-p		Sp. Roadster	1,675	DAVIS									<b>Without Starter and Dem. Rims</b>		2980	5-p		Phaeton Std.	\$1,685	
3645	7-p		Touring	1,565				<b>"71"</b>		1385	2-p		Runabout	\$265	3170	5-p		Phaeton DeLuxe	1,885		
3605	4-p		Sp. Touring	1,725	2700	3-p		M. O'War Road.	\$1,395	1475	5-p		Touring	295	3190	5-p		Tourster	2,085		
3770	4-p		Coupe	1,995	2810	4-p		Legionaire Tour.	1,495				<b>With Starter and Dem. Rims</b>		3130	2-p		Speedster	2,185		
4020	7-p		Sedan	2,285	2750	5-p		Phaeton	1,395	1535	2-p		Runabout	\$350	3430	4-p		Coupe	2,585		
3940	5-p		Brougham Sedan	2,235	3070	5-p		Sedan	1,895	1625	5-p		Touring	380	3530	5-p		Brougham	2,685		
CADILLAC					3100	5-p		Berline Sedan	1,995	1730	2-p		Coupe	525		5-p		Sedan	2,385		
			"V-63"		3000	5-p		Brougham	1,595	1915	5-p		Sedan, Fordor	685		5-p		Victoria	2,685		
4190	4-p		Roadster	\$3,085				<b>"81"</b>					Sedan, Tudor	590		2-p		Enc. Speedster	2,785		
4280	7-p		Touring	3,085	2950	3-p		Roadster	1,695	FRANKLIN					7-p			Sedan	3,385		
4200	4-p		Phaeton	3,085	3000	5-p		Phaeton	1,695				<b>"10 B"</b>		7-p			Sedan	3,485		
4270	2-p		Coupe	3,875	3200	5-p		Sedan	2,195	2580	5-p		Touring	\$1,950	LAFAYETTE						
4370	5-p		Sp. Coupe	3,950	3200	5-p		Brougham	1,895	2710	4-p		Coupe	2,750	4010	7-p		Touring	\$3,250		
4600	5-p		Sedan	4,400	3250	5-p		Berline Sedan	2,295	2730	5-p		Sedan	2,850	3905	4-p		Torpedo	3,250		
4610	7-p		Sedan	3,585	LODGE BROTHERS							2655	5-p	Demi-Sedan	2,250	4210	4-p		Coupe	4,300	
4480	5-p		DeLuxe Sedan	4,150	2513	2-p		Roadster	\$865	2835	5-p		Tour. Limousine	2,950	4350	5-p		Sedan	4,400		
4530	5-p		Town Brougham	4,600	2653	2-p		Spec. Roadster	1,025					4470	7-p		Imp. Sedan	4,500			
4640	7-p		Limousine	4,600	2610	5-p		Touring	895	2500	2-p		Roadster	\$945	4375	7-p		Limousine	4,000		
4640	7-p		Suburban	4,500	2755	5-p		Spec. Touring	1,055	2550	5-p		Touring	995	4480	7-p		Imperial Lim.	4,700		
4560	7-p		DeLuxe Suburban	4,250	2809	4-p		Coupe	1,375	GARDNER					LEXINGTON						
4380	4-p		Victoria	3,275	2755	2-p		Coupe B	1,035				<b>"Series 5"</b>		"Minute Man"						
CASE					2929	4-p		Spec. Coupe	1,535	2680	5-p</										



# Prices and Weights of Current Passenger Car Models

Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price
<b>LINCOLN</b>					<b>OAKLAND</b>					<b>REVERE</b>					<b>STEVENS-DURYEA</b>				
4050	2-p		Roadster	\$3,800	2420	3-p		Roadster	\$995	3700	2-p		Roadster	\$3,200	4200	2-p		Roadster	\$8,150
4290	7-p		Touring	3,800	2510	3-p		Sp. Roadster	1,095	3500	4-p		Speedster	3,200	4400	7-p		Touring	7,500
4215	4-p		Phaeton	3,800	2485	5-p		Touring	995	3800	5-p		Touring	3,200	4250	4-p		Sp. Touring	7,750
4380	5-p		Coupe	4,400	2550	5-p		Sp. Touring	1,095	4300	5-p		Sedan	4,000	4600	4-p		Coupe	9,000
4375	4-p		Sedan	4,600	2620	3-p		Coupe	1,195					4600	4-p		Sedan	10,000	
4600	5-p		Sedan	4,700	2720	4-p		Coupe	1,395					4800	6-p		Sedan	9,675	
4660	7-p		Sedan	4,900	2860	5-p		Sedan	1,445					4800	6-p		Town Brougham	10,175	
4720	7-p		Limousine	5,100										4800	6-p		Vestibule Limou.	9,675	
<b>LOCOMOBILE</b>					<b>OLDSMOBILE</b>					<b>RICKENBACKER</b>					<b>STUDEBAKER</b>				
			"Series 8"		2145	2-p		Roadster	\$785	2725	3-p		Sp. Roadster	\$1,645	2510	3-p		Roadster	\$1,025
5330	4-p		Sportif Tour.	\$7,900						2644	5-p		Sp. Touring	1,595	2650	5-p		Touring	1,045
5460	5-p		Victoria Sedan	10,500	2170	2-p		Roadster	885	2845	4-p		Coupe	2,035	2650	2-p		Coupe	1,195
5265	7-p		Brougham	10,500	2320	5-p		Sp. Touring	915	2750	5-p		Sedan	2,135	2955	5-p		Coupe	1,395
5480	7-p		Tour. Limousine	9,500	2295	2-p		Cab	985					3030	5-p		Sedan	1,485	
5460	7-p		Encl. Drive Lim.	10,500	2410	4-p		Coupe	1,075										
5722	7-p		Cabriolet	10,750	2570	5-p		Sedan	1,135										
<b>McFARLAN</b>								Sp. Sedan	1,245	<b>ROAMER</b>					<b>Special Six "EL"</b>				
			"6" TV		<b>OVERLAND</b>					<b>"6-54-E" (118 in. W. B.)</b>					3065	2-p		Roadster	1,400
4600	2-p		Roadster	\$5,400				"91" (100 in. W. B.)		4100	5-p		Spec. Sedan	4,250	3305	5-p		Touring	1,425
4600	4-p		Sport Touring	5,600	1844	2-p		Roadster	\$495	4200	7-p		Suburban-Sedan	3,950	3600	5-p		Coupe	1,895
4700	7-p		Touring	5,700	1910	5-p		Touring	495					3650	5-p		Sedan	1,985	
4900	4-p		Coupe	6,720	2100	2-p		Coupe	750										
5200	4-p		Tour. Sedan	6,720	2200	7-p		Sedan	795										
5200	7-p		Tour. Sedan	6,810	2053	5-p		Champion	695										
5200	7-p		Sp. Sedan	6,600				"92" (106 in. W. B.)											
5200	7-p		Sub. Sedan	7,000	2047	5-p		Red Bird	695										
5100	7-p		Limousine	6,900				Blue Bird	725										
5200	7-p		Town Car	9,000	<b>PACKARD</b>														
			"Light 6" SV					"6" (126 in. W. B.)											
3700	3-p		Roadster	2,500	3165	4-p		Roadster	\$2,785										
3700	5-p		Touring	2,500	3320	5-p		Touring	2,585										
3850	4-p		Coupe	3,000	3255	4-p		Sp. Touring	2,750										
3850	5-p		Sedan	3,000	3425	5-p		Per. Top. Touring	2,850										
<b>MARMON</b>					3400	4-p		Coupe	3,275										
			"34"		3515	5-p		Coupe	3,450										
3470	2-p		Speedster	\$3,095	3565	5-p		Sedan	3,375										
3650	4-p		Speedster	3,095	3610	5-p		Sedan Limousine	3,425										
3575	4-p		Phaeton	2,895				"6" (133 in. W. B.)											
3690	7-p		Phaeton	2,895	3430	7-p		Touring	2,785										
3770	4-p		Coupe	4,125	3690	7-p		Sedan	3,625										
3970	4-p		Sedan	3,985	3765	7-p		Sedan Limousine	3,675										
4155	7-p		Sedan	3,985				"8" (136 in. W. B.)											
4220	7-p		Brougham	3,985	3880	4-p		Runabout	3,850										
4100	7-p		Suburban	4,285	3990	5-p		Touring	3,650										
4000	7-p		Limousine	4,285	3990	4-p		Sp. Touring	3,800										
			Town Car	4,285	4125	4-p		Coupe	4,550										
<b>MAXWELL</b>					4200	5-p		Coupe	4,725										
			"25"		4270	5-p		Sedan	4,650										
2225	2-p		Roadster	\$875	4275	5-p		Sedan Limousine	4,700										
2460	2-p		Sp. Roadster	975				"8" (143 in. W. B.)											
2250	5-p		Touring	875	4020	7-p		Touring	3,850										
2470	5-p		Sp. Touring	1,045	4275	7-p		Sedan	4,900										
2450	4-p		Coupe	1,195	4350	7-p		Sedan Limousine	4,950										
2325	2-p		Club Coupe	995	<b>PAIGE</b>														
2450	5-p		Club Sedan	1,075				"6-70"											
2750	5-p		Traveller	1,585	3677	4-p		Phaeton	\$1,795										
2650	5-p		Sedan	1,295	3742	7-p		Phaeton	1,795										
<b>MOON</b>					3880	4-p		Phaeton DeLuxe	1,995										
			Series "A"		4040	5-p		Sedan	2,595										
2490	5-p		Touring	\$1,095	4128	7-p		Sedan	2,595										
			Sp. Touring	1,295				Sub. Limousine	2,895										
			"6-40"		4100	5-p		Sedan DeLuxe	2,770										
2650	3-p		Roadster	1,395	3900	5-p		Brougham 4 d.	2,175										
2860	5-p		Touring	1,395	<b>PEERLESS</b>														
2870	5-p		Sp. Touring	1,595				"6"											
2920	4-p		Coupe	1,785	3230	2-p		Roadster	\$2,185										
2920	5-p		Sedan	1,795	3380	4-p		Touring	2,185										
3090	5-p		Petite Sedan	1,995	3710	5-p		Sedan	2,875										
			"6-50"					"8"-66											
2750	3-p		Roadster	1,595	3980	7-p		Tour. Phaeton	2,690										
2850	5-p		Touring	1,595	4300	5-p		Sedan	2,750										
2970	5-p		Sp. Touring	1,695	4355	7-p		Sedan	3,690										
3020	4-p		Coupe	1,985	4430	7-p		Berline	4,090										
3120	5-p		Sedan	1,985	4130	4-p		Victoria Coupe	3,390										
3190	5-p		Sp. Sedan	2,195	<b>PIERCE-ARROW</b>														
			"6-58"					"33"											
3290	7-p		Touring	1,885	4350	2-p		Runabout	\$5,250										
3270	5-p		Sp. Touring	2,150	4590	5-p		Touring	5,250										
3370	7-p		Sp. Phaeton	2,095	4780	3-p		Coupe	6,800										
3510	7-p		Sedan	2,585	4830	4-p		Sedan	6,900										
3590	5-p		Petite Sedan	2,685	4960	7-p		Sedan	7,000										
<b>NASH</b>					4750	4-p		Coupe Sedan	6,900										
			"41"		4730	6-p		Brougham	6,800										
2600	2-p		Roadster	\$915	4850	7-p		Limousine	7,000										
2720	5-p		Touring	935	5060	7-p		Enclosed Lim.	7,000										
2980	5-p		Sp. Touring	1,195	4780	7-p		French Lim.	7,000										
2750	5-p		Business Coupe	1,165	4732	6-p		Landulet	7,000										
3090	5-p		Sedan	1,445	<b>PREMIER</b>														
2910	5-p		Carriole	1,275				"6-D"											
			"6" (121 in. W. B.)		3710	2-p		Roadster	\$2,885										
2930	2-p		Roadster	1,275	3870	5-p		Open-Touring	2,885										
3530	4-p		Sp. Roadster	1,645	3920	7-p		Touring	2,935										
3120	5-p		Touring	1,275	3910	5-p		Sp. Touring	2,985										
3440	5-p		Coupe 4 d.	2,090	4320	7-p		Sedan	4,175										
3550	5-p		Sedan	2,040	4185	5-p		Brougham	4,175										
3400	5-p		Spec. Sedan	1,640	<b>REO</b>														
			"692" (127 in. W. B																

# Current Passenger Car Specifications

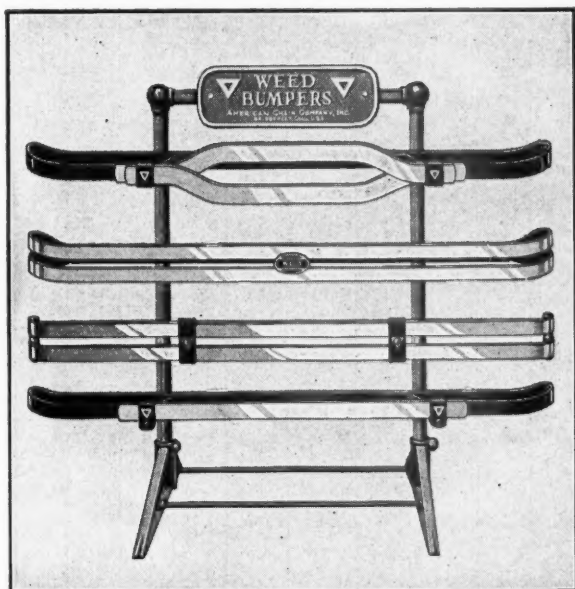
(This list comprises cars distributed on a national basis)

MAKE AND MODEL		TIRES		ENGINE										Electrical System		Clutch	Gear-set	Universal Joints	REAR AXLE		BRAKES				Steering Gear	Run Springs
		Wheelbase (Ins.)	Standard Size (Ins.)	Ballon Equipment	Make	Model	Number of Cylinders, Bore and Stroke (Ins.)	Rated Horsepower, N.A.C.C.	Valve Arrangement	Piston Material	Number of Main Crankshaft Bearings	Oiling System	Carburetor Make	Ignition System Make	Generator and Starter Make	Type and Make	Make	Type and Make	Type and Make	Gear Ratio	Foot, Type and Location	Hand, Type and Location	Four Wheel Brake Type	Make	Type and Location	
American.....D-66	127	33x4 1/2	No	H-Sp	91	6-3 1/2 x 5 1/2	29.40	L	C	3	PS	Str	A-K	G-D	P-B&B	War	M-Har	F-Sal	5.10	E-R	I-R	None	Lav	S-57 1/2		
Anderson.....41	115	32x4	Yes*	Cont	7U	6-3 1/2 x 4 1/2	23.44	L	C	4	PC	Zen	Wes	Rem	P-B&B	Dur	R-Goo	1 1/2 Sal	5.75	E-R	E-T	Mec*	Gem	S-58		
Anderson.....5	122	32x4	Yes*	Cont	8R	6-3 1/2 x 4 1/2	27.34	L	C	4	PC	Zen	Wes	Rem	P-B&B	Dur	R-Goo	1 1/2 Sal	4.50	E-R	E-T	Mec*	Gem	S-58		
Apperson.....6	120	32x4	Yes*	Fall	T8000	6-3 1/2 x 4 1/2	23.44	L	C	3	PS	Str	Rem	Rem	P-Roc	Mec	M-Thi	1 1/2 Col	5.10	E-R	I-R	Mec*	Lav	J-48		
Apperson.....8	130	33x5	No	Own	8	8-3 1/2 x 5 1/2	33.80	L	C	3	FP	Joh	Rem	Bij	D-Own	Own	M-Thi	1 1/2 Own	4.25	E-R	I-R	Mec*	Own	J-48		
Auburn.....6-43	114	31x4	Yes*	Cont	7U	6-3 1/2 x 4 1/2	23.44	L	C	4	PC	Str	Rem	Rem	P-B&B	War	M-Uni	1 1/2 Col	4.63	E-R	E-T	Mec*	Jac	S-57		
Auburn.....6-63	124	32x4 1/2	Yes*	Weid	Spec	6-3 1/2 x 5 1/2	25.35	I	C	3	PC	Str	Rem	Rem	P-B&B	War	M-Thi	1 1/2 Col	4.65	E-R	E-T	Mec*	Ros	S-57		
Barley.....6-50	118	32x4	No	H-Sp	40	6-3 1/2 x 5 1/2	25.35	L	C	4	PC	Str	Del	Del	P-B&B	Ful	R-M&E	1 1/2 Col	5.10	E-F	I-R	Hyd	Jac	S-56		
Buick.....4	109	31x4	No	Own	4	4-3 3/4 x 4 3/4	18.23	I	C	4	PC	Mar	Del	Del	D-Own	Own	M-Own	1 1/2 Own	4.66	E-F	I-R	Mec	Jac	S-55 1/2		
Buick.....6	120	32x4	No	Own	6	6-3 3/4 x 4 3/4	27.34	I	C	4	PC	Mar	Del	Del	D-Own	Own	M-Own	1 1/2 Own	4.10	E-F	I-R	Mec	Jac	V-46 1/2		
	128	32x4 1/2	No	Own	6	6-3 3/4 x 4 3/4	27.34	I	C	4	PC	Mar	Del	Del	D-Own	Own	M-Own	1 1/2 Own	4.70	E-F	I-R	Mec	Jac	V-46 1/2		
Cadillac.....V-63	132	33x5	No	Own	63	8-3 1/2 x 5 1/2	31.25	L	C	3	PC	Own	Del	Del	D-Own	Own	M-Spi	F-Tim	4.50	B-F	I-R	Mec	Own	N-54		
Case.....X	122	32x4 1/2	No	Cont	8R	6-3 1/2 x 4 1/2	27.34	L	C	4	PC	Sch	Del	Del	D-Own	Own	R-Sne	1 1/2 Col	4.90	E-R	I-R	None	Jac	S-54 1/2		
Case.....Y	132	33x5	No	Cont	6T	6-3 1/2 x 5 1/2	31.54	L	C	4	PC	Ray	Del	Del	D-Own	Own	R-Sne	1 1/2 Col	4.70	E-R	I-R	None	Jac	S-57		
Chalmers.....Y	117	32x4	No	Own	6	6-3 1/2 x 4 1/2	25.35	L	A	3	PS	Str	A-L	A-L	P-Mec	War	M-Mec	1 1/2 Tim	5.13	E-R	I-R	Hyd*	Gem	S-56		
Chalmers.....Y	122	33x4 1/2	No	Own	6	6-3 1/2 x 4 1/2	25.35	L	A	3	PS	Str	A-L	A-L	P-Mec	War	M-Mec	1 1/2 Tim	5.13	E-R	I-R	Hyd*	Gem	S-56		
Chandler.....SS	123	32x4	No	Own	6	6-3 1/2 x 5 1/2	29.40	L	A	4	PS	Str	Bos	Bos	P-B&B	Own	Own	F-Own	4.45	E-R	E-T	None	Own	S-56		
Chevrolet.....Superior	103	30x3 1/2	No	Own	6	4-3 1/2 x 4 1/2	21.76	I	C	3	PS	(Zen)	Rem	(Rem)	K-Own	Own	M-Own	1 1/2 Own	3.77	E-R	I-R	None	Own	Q-38		
Chrysler.....Six	112 1/2	29x4 1/2	S.E.	Own	6	6-3 x 4 1/2	21.60	L	A	7	FP	Bal	Rem	Rem	D-Own	Own	M-Det	1 1/2 Own	4.60	E-F	E-T	Hyd	Jax	S-51 1/2		
Cleveland.....4	112 1/2	31x4	Yes*	Own	42	6-3 1/2 x 4 1/2	22.50	L	C	3	PS	Str	Bos	Bos	P-B&B	Own	M-Mec	1 1/2 Own	4.90	E-R	E-T	None	CAS	S-57		
Cole.....Master	127 1/2	33x5	Yes*	Nort	311	8-3 1/2 x 5 1/2	39.20	L	A	3	PC	Joh	Del	Del	D-Nor	Nor	M-Spi	F-Col	4.70	E-R	E-T	None	Own	S-53		
Columbia.....115	115	31x4	Yes*	Cont	7U	6-3 1/2 x 4 1/2	23.44	L	C	4	PC	Str	A-L	A-L	P-B&B	Dur	M-Spi	1 1/2 Tim	4.80	E-R	E-T	Hyd*	Gem	S-56		
Crawford.....6-72	138	33x4 1/2	No	Cont	6T	6-3 1/2 x 5 1/2	31.54	L	C	4	PC	Zen	Wes	Bos	D-B-L	B-L	M-Spi	1 1/2 Tim	5.00	E-R	I-R	None	Lav	S-56		
Cunningham.....V4	132	33x5	No	Own	V4	8-3 1/2 x 5 1/2	45.00	L	C	3	FP	Str	Del	Del	D-Own	Own	R-Sne	F-Tim	4.23	E-R	I-R	None	Gem	J-42		
	12	33x5	No	Own	V4	8-3 1/2 x 5 1/2	45.00	L	C	3	FP	Str	Del	Del	D-Own	Own	R-Sne	F-Tim	4.23	E-R	I-R	None	Gem	J-42		
Dagmar.....6-7	138	33x5	No	Cont	6T	6-3 1/2 x 5 1/2	31.54	L	C	4	PC	Zen	Wes	Bos	D-B-L	B-L	M-Spi	1 1/2 Tim	5.00	E-R	I-R	None	Lav	S-56		
Davis.....71	115	31x4	Yes*	Cont	7U	6-3 1/2 x 4 1/2	23.44	L	C	4	PC	Str	A-L	A-L	P-B&B	War	M-Pet	1 1/2 Tim	5.10	E-R	I-R	Hyd*	CAS	S-52		
Davis.....81	118	31x4	Yes*	Cont	8R	6-3 1/2 x 4 1/2	27.34	L	C	4	PC	Str	A-L	A-L	P-B&B	War	M-Pet	1 1/2 Tim	5.10	E-R	I-R	Hyd*	CAS	S-52		
Dodge Brothers.....116	116	32x4	Yes*	Own	4	4-3 3/4 x 4 3/4	24.03	L	A	3	Sp	Ste	N-E	N-E	D-Own	Own	M-Own	1 1/2 Own	4.54	E-R	I-R	None	Own	S-55		
Dort.....27	115	31x4	Yes*	Fall	T8000	6-3 1/2 x 4 1/2	23.41	I	C	3	PC	Car	Bos	Bos	D-Dtl	Own	M-The	3/4 Fli	4.66	E-R	I-R	None	Gem	V-50		
Duesenberg Straight.....8	134	33x5	No	Own	8	8-2 1/2 x 5 1/2	26.45	I	A	3	PC	Str	Del	Del	P-Own	Own	R-Cl	1 1/2 Own	4.90	I-F	E-T	Hyd	Lav	S-56		
Dupont.....C	124	32x4 1/2	No	H-Sp	90	6-3 1/2 x 5 1/2	29.40	L	C	3	PS	Str	Wes	Wes	D-B-L	B-L	M-Spi	F-Col	4.45	E-R	E-T	None	Own	S-58		
Durant.....A-22	109	31x4	Yes*	Cont	Spec	4-3 3/4 x 4 3/4	24.03	I	C	3	PC	Til	A-L	A-L	P-Own	War	M-Spi	3/4 Ad	4.33	E-R	I-R	Mec*	War	S-48		
Elcar.....4-40	112	31x4	No	Lyco	CF	4-3 3/4 x 5 1/2	21.03	L	A	5	PC	Zen	Del	Del	P-B&B	W-G	M-Mec	1 1/2 Sal	4.70	E-R	I-R	Mec*	CAS	S-51		
Elcar.....6-50	113	31x4	No	Cont	7U	6-3 1/2 x 4 1/2	23.44	L	C	4	PC	Str	A-L	A-L	P-B&B	W-G	M-Mec	1 1/2 Sal	4.70	E-R	E-T	Mec*	Ros	S-51		
Elcar.....6-60	118	32x4	Yes*	Cont	8R	6-3 1/2 x 4 1/2	27.34	L	C	4	PC	Str	Del	Del	P-B&B	W-G	M-Har	1 1/2 Sal	4.70	E-R	I-R	Mec*	Gem	S-52		
Elgin.....25	118	32x4 1/2	Yes*	Fall	T8000	6-3 1/2 x 4 1/2	23.44	I	C	3	PS	Str	Del	Del	P-B&B	War	R-Sne	1 1/2 Col	4.66	I-F	E-T	Mec*	Ros	O-47		
Essex.....6	110 1/2	31x3 3/4	No	Own	6	6-2 1/2 x 4 1/2	16.54	L	A	3	Sp	Ste	Bos	Bos	D-Own	Own	M-Spi	1 1/2 Own	5.60	E-R	I-R	None	Own	S-54 1/2		
Flint.....40	115	30x4 1/2	S.E.	Own	Spec	6-3 1/2 x 4 1/2	23.44	L	C	7	PC	Til	A-L	A-L	P	War	M-Spi	1 1/2 Ad	4.77	E-F	E-F	Mec*	War	S-54		
Flint.....6	120	32x4 1/2	Yes*	Cont	Spec	6-3 1/2 x 5 1/2	27.34	L	C	7	PC	Str	Del	Del	P-Own	War	M-Spi	1 1/2 Ad	4.77	E-F	E-F	Mec*	War	S-54		
Ford.....T	100	30x3 1/2	No	Own	T	4-3 3/4 x 4 1/2	22.50	L	C	3	Sp	(Own)	Own	Own	D-Own	Own	M-Own	3/4 Own	6.63	E-T	I-R	None	Own	O-43 1/2		
Franklin.....10-B	115	32x4 1/2	Yes*	Own	10-B	6-3 1/2 x 4 1/2	25.35	I	A	7	PS	Own	A-K	A-K	P-M&E	Own	M-Spi	F-Own	4.73	E-T	E-R	None	Own	E-38		
Gardner.....Series 5	112	32x4	Yes*	Lyco	Spec	4-3 1/2 x 5 1/2	21.76	L	A	5	PC	Zen	Wes	Wes	P-B&B	Mec	M-Pet	3/4 Fli	4.80	I-R	I-R	None	Own	E-38		
Gray.....O	104	30x3 1/2	No	Own	0	4-3 3/4 x 4 1/2	21.03	L	C	3	Sp	Str	Wes	Wes	P-Own	Own	M-Own	1 1/2 Tim	3.90	I-R	I-R	None	Own	Q-30		
H.C.S.....Series 4	120	32x4 1/2	No	Weid	Spec	4-3 3/4 x 5 1/2	22.50	I	C	3	PS	Str	Del	Del	D-B-L	B-L	M-Spi	1 1/2 Own	4.63	I-R	I-R	None	Gem	S-56		
H.C.S.....Series 6	126	32x5	Yes*	Own	6	6-3 1/2 x 5 1/2	29.40	I	C	3	FP	Str	Bos	Bos	D-B-L	B-L	M-Spi	1 1/2 Own	4.36	I-R	I-R	None	Gem	S-56		
Hatfield.....6-55	121	32x4	No	H-Sp	40	6-3 1/2 x 5 1/2	25.35	L	C	3	PS	Str	Bos	Bos	P-B&B	Dur	M-Spi	1 1/2 Col	4.63	E-R	I-R	None	Gem	S-58		
Haynes.....60	121	32x4 1/2	Yes*	Own	60	6-3 1/2 x 4 1/2	29.40	L	C	3	PS	Ray	Kin	L-N	D-Own	Mec	M-Thi	1 1/2 Own	4.41	E-R	E-T	None	Jac	S-54 1/2		
Hudson.....Super 6	127	34x4 1/2	No	Own	6	6-3 1/2 x 5 1/2	29.40	L	A	4	Sp	Str	Bos	Bos	D-Own	Own	M-Spi	F-Tim	4.45	E-R	I-R	None	Gem	S-58		
Hupmobile.....Series R	115	32x4	No	Own	R	4-3 1/2 x 5 1/2	16.90	L	A	3	PC	Str	Wes	Wes	D-Lon</											





## 4 Light Cars to 1 Medium and Heavy Weight Car



### WEED Bumper Stands

**No. 225 Four Bumper Stand**—Furnished free to contract dealers through our distributors. An initial order for 25 Bumpers and a contract for 50 to be taken within a year is required to obtain one of these stands.

**No. 1 Single Bumper Stand**—Furnished free to dealers on orders for three or more WEED Bumpers through their distributors.

Four-fifths of the cars on the road are light cars. Are you prepared to equip any and all makes with Bumpers? Do not overlook

## The Big Market for **WEED** LIGHT CAR **BUMPERS**

Carry the four WEED Bumpers shown on this page and you will have a bumper to satisfy the taste and purse of every light car owner.

One set of front fittings, and one set of rear fittings for each light car, with an assortment of the four bars enable you to offer to your customers a choice of the bars, as all four bars can be used with the same fittings. The bars are interchangeable, front or rear.

## AMERICAN CHAIN COMPANY, INC.

BRIDGEPORT, CONNECTICUT

In Canada: DOMINION CHAIN COMPANY, Limited, Niagara Falls, Ontario

District Sales Offices: Boston Chicago New York Philadelphia Pittsburgh San Francisco

World's Largest Manufacturers of Welded and Weldless Chains for All Purposes



# Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

MAKE AND MODEL	Wheelbase (Ins.)	TIRES		ENGINE										Electrical System		Clutch	Gear-set	Universal Joints	REAR AXLE		BRAKES				Steering Gear	Rear Spring	
		Standard Size (Ins.)†	Ballon Equipment	Make	Model	Number of Cylinders, Bore and Stroke (Ins.)	Rated Horsepower, N.A.C.C.	Valve Arrangement	Piston Material	Number of Main Crankshaft Bearings	Oiling System	Carburetor Make	Ignition System Make	Generator and Starter Make	Type and Make	Make	Type and Make	Type and Make	Gear Ratio†	Foot, Type and Location	Hand, Type and Location	Four Wheel Brake Type	Make	Type and Location			
Paige.....6-70	131	33x4½	Yes*	Cont	Spec	6-3½x5	33.75	L C	4	PC	Ray	A-K	Rem	D-Lon	W-G	M-Mec	½ Tim	4.90	E-R	I-R	None	Gem	S-40				
Peerless.....Six	126	32x4½	S.E.	Own	6	6-3½x5	29.40	L C	7	PC	Joh	Del	Del	D-Own	Own	M-Spi	½ Tim	4.66	E-F	I-R	None	Gem	S-40				
Peerless.....66	128	33x5	Yes*	Own	66	8-3¼x5	33.80	L C	7	PC	Del	Del	Del	D-Own	Own	M-Spi	¾ Tim	4.90	E-R	I-R	Hyd*	Gem	S-40				
Pierce-Arrow.....33	138	33x5	No	Own	33	6-4 x5½	38.40	T C	7	FP	Del	Del	Del	D-Own	Own	M-Spi	¾ Tim	4.29	E-R	I-R	Hyd*	Gem	S-40				
Premier.....6-D	126¾	32x4½	Yes*	Own	6-D	6-3½x5½	27.34	I A	3	PC	Str	Del	Del	P-B&B	Own	M-Blo	½ Col	4.58	E-R	I-R	Hyd*	Own	S-57½				
R&V Knight.....H	124	32x4½	No	Own	Kni	6-3½x4½	29.40	X C	4	PC	Str	A-L	A-L	P-B-L	B-L	M-Spi	½ Tim	4.50	E-R	I-R	None	Jac	S-61				
Reo.....T6	120	32x4	Yes*	Own	T6	6-3½x5	24.34	G C	4	PS	Ray	NE	NE	D-Own	Own	M-Spi	½ Tim	4.70	E-R	I-R	None	Own	S-56½				
Revere.....M	131	32x4½	Yes*	Mons	4	4-4½x6	30.63	H A	2	PS	Str	Bos	Wes	D-B-L	B-L	M-Spi	¾ Stn	3.44	E-R	I-R	None	Gem	S-58				
Rickenbacker.....C	117	32x4	Yes*	Own	C	6-3½x4¾	23.44	L C	3	PC	Bos	Bos	Bos	P-Own	Own	R-Mec	¾ Tim	5.10	I-F	E-T	None	Gem	S-57				
Roamer.....6-54-E	118	32x4½	No	Cont	12XD	6-3½x5¼	29.40	L A	3	PS	Str	Spl	Wes	P-B&B	Own	R-M&E	¾ Tim	4.60			Mec*	Jac	V-58				
Roamer.....4-75-E	128	32x4½	No	Dues	G1	4-4½x6	28.90	H A	3	FP	Str	Bos	Wes	D-B-L	B-L	R-M&E	¾ Tim	4.63	E-R	I-R	Mec*	Jac	V-58				
Rollin.....112	112	31½x5½	S.E.	Own		4-3½x4½	16.90	L A	4	PC	Til	Con	Dyn	P-B&B	Mun	R-Sne	½ Sal	5.10	E-F	E-F	S.E.	Dit	V-58				
Rolls-Royce.....40-50	143½	33x5	No	Own	40	6-4½x4¾	48.60	L A	7	FP	Own	Bos	"O"	K-Own	Own	M-Own	½ F Own	3.72	I-R		None	Own	V-46				
Sayers Six.....GL	136	33x5	No	Cont	6J	6-3½x5	33.75	L C	5	PC	Str	Del	Del	P-B&B	B-L	M-Cli	F Tim	4.91	E-R	I-R	None	Ros	S-51				
Seneca.....50&51c	112	31x4	No	Lyc	CF	4-3½x5	21.03	L A	5	PC	Zen	A-L	A-L	P-B&B	Own	M-Uni	F Pen	4.50	E-R	I-R	None	Dit	S-52				
Stanley.....740	130	32x4½	No	Own	740	2-4 x5	13.00	L C	3	PS	Non	Non	Bij	Non	Non	Non	Non	¾ Own	4.50	E-R	I-R	None	None				
Star.....4	102	30x3½	No	Cont	Spec	4-3½x4½	15.63	L C	3	PS	Til	A-L	A-L	P-Own	War	M-Spi	¾ Ad	4.87	E-R	I-R	Mec*	War	S-49				
Stearns-Knight.....SKL	119	33x4½	No	Own	Kni	4-3½x5½	22.50	X C	4	PC	Sch	A-K	A-L	D-Own	Own	R-Ch	¾ Tim	4.50	E-R	I-R	Hyd*	Own	V-30				
Stearns-Knight.....6	130	33x5	No	Own	Kni	6-3½x5	25.35	X C	4	PC	Sch	A-K	A-L	D-Own	Own	R-Ch	¾ Tim	4.70	E-R	I-R	Hyd*	Own	V-30				
Stephens.....104&20	117	32x4	No	Own	20	6-3½x4½	25.35	I C	3	FP	Str	Del	Del	P-B&B	Mec	M-Mec	1½ Tim	5.10	E-R	E-T	Hyd*	Own	V-30				
Sterling-Knight.....124	124	33x4½	No	Own	Kni	6-3½x4½	25.35	X C	7	FP	Str	Wes	Wes	D-Ful	Ful	R-Ch	½ Tim	4.56	E-R	I-R	None	Ros	S-53				
Stevens Duryea.....G	138	33x5	No	Own	G	6-4½x5½	47.25	L C	4	PC	Str	Bos	Bos	D-Own	B-L	M-Spi	F Tim	3.76	E-R	I-R	None	Ros	S-57				
Studebaker.....Light Six	112	31x4	No	Own	LS	6-3½x4½	23.44	L C	4	PS	Str	Wag	Wag	P-Own	Own	R-The	½ Own	5.00	E-R	I-R	None	Own	S-50				
Studebaker.....Spec Six	119	32x4	No	Own	SS	6-3½x5	29.40	L C	4	PS	Str	Wag	Wag	P-Own	Own	M-Spi	½ Own	4.33	E-R	I-R	None	Own	S-50				
Studebaker.....Big Six	126	33x4½	No	Own	B8	6-3½x5	36.04	L C	4	PS	Bal	Wag	Wag	P-Own	Own	M-Spi	½ Own	3.71	E-R	I-R	None	Own	S-50				
Stutz.....690	120	32x4½	No	Weid	Spec	6-3½x5	27.34	I B	3	FP	Str	Rem	Rem	P-B&B	W-G	M-Mec	½ Tim	4.66	E-R	I-R	None	Gem	S-42				
Stutz.....KLDH	130	32x4½	No	Own	KLDH	4-4½x6	30.63	T C	3	PC	Str	Del	Del	D-W-G	Own	M-Har	¾ Tim	3.75	I-R	I-R	None	Gem	S-40				
Stutz.....695	130	32x4½	Yes*	Own	695	6-3½x5	29.40	I C	3	PC	Str	Rem	Rem	P-B&B	W-G	M-Uni	½ Tim	4.66	E-R	I-R	Hyd*	Gem	S-41				
Templar.....122	122	33x4	No	Own		6-3½x5	27.34	L C	4	PS	Til	Dyn	Con	P-M&E	War	R-Cli	¾ Sal	5.10	I-F	E-T	Mec	Gem	S-54				
Velie.....56&58	118	32x4	Yes*	Own	56	6-3½x4½	24.38	I C	4	FP	Str	A-K	Wes	P-Doo	Dur	M-Thi	½ Own	4.00	E-R	I-R	Hyd*	Gem	S-55				
Westcott.....48	125	32x4½	Yes*	Cont	12X	6-3½x5½	29.40	L A	4	PS	Ray	Del	Del	P-B&B	B-L	M-Pet	½ Tim	4.45	E-R	I-R	Mec*	Gem	S-50				
Westcott.....44	120	32x4½	Yes*	Own	8R	6-3½x4½	27.34	L C	4	PC	Ray	Del	Del	P-B&B	War	M-Pet	½ Col	4.90	E-R	E-T	Mec*	Gem	S-57½				
Westcott.....60	118	32x4½	Yes*	Own	60	6-3½x5	25.35	L C	7	PC	Ray	Del	Del	P-M&E	War	M-Pet	½ Col	4.66	E-R	E-T	Mec*	Gem	S-57½				
Wills Ste. Claire.....A&B68	121	32x4½	SE	Own	68	8-3¼x4	33.80	I C	3	FP	Sch	Del	Del	D-Own	Own	M-Spi	½ Tim	4.45	E-F	I-R	Hyd	Own	S-54				
Willys Knight.....64&67	118	32x4	No	Own	64	4-3½x4½	21.03	X C	3	PS	Til	A-L	A-L	D-B&B	Own	R-Own	F Own	4.44	E-R	I-R	None	Own	S-55				
TAXICABS																											
Checker.....117	117	32x4½	No	Buda	WTU	4-3½x5½	22.50	L C	3	PC	Zen	Bos	Wes	D-Ful	Ful	Blo	¾ Col	4.87	E-R	I-R	None	Jon	S-57½				
Dodge.....116	116	32x4	Yes*	Own		4-3½x4½	24.03	L A	3	SP	Ste	N-E	N-E	D-Own	Own	M-Own	½ Tim	4.54	E-R	I-R	None	Own	S-55				
Driggs.....108½	108½	30x3½	No	Own		4-2½x4½	11.03	L C	3	PS	Zen	N-E	N-E	D-Ful	Ful	M-Own	¾ Tim	4.75	E-R	I-R	None	Own	S-55				
Elcar.....4	118	33x4½	No	Lyc	CF	4-3½x5	21.03	L A	5	PC	Car	Del	Del	P-B&B	Mun	Pet	¾ Sal	4.75	E-R	I-R	None	CAS	S-51				
Elcar.....6	118	33x4½	No	Cont	8R	6-3½x4½	27.34	L C	4	PC	Str	Del	Del	P-B&B	War	Spi	¾ Sal	4.75	E-R	I-R	None	Gem	S-52				
Kelsey.....E	112	32x4	No	Lyc	CH	4-3½x5	19.60	L A	5	PC	Zen	Bos	Bos	P-B&B	W-M	M-Spi	¾ Sal	5.10	E-R	I-R	None	Lav	S-53				
Pennant.....115	115	33x4½	No	Buda	WTU	4-3½x5½	22.50	L B	3	PC	Zen	Bos	Wes	D-Ful	Ful	Blo	¾ Col	4.87	E-R	I-R	None	Jon	S-57				
Premier.....4A	118	33x4½	No	Buda	WTU	4-3½x5½	22.50	L B	3	PC	Zen	Bos	Bos	D-Ful	Ful	Blo	¾ Col	4.70	E-R	I-R	None	Own	S-57½				
Rauch & Lang.....T	112	32x4	No	Buda	WTU	4-3½x5½	22.50	L B	3	PC	Zen	Bos	Dyn†	P-Det	Det	Spi	½ Sta	5.10	E-R	E-T	None	Gem	S-50½				
Rauch & Lang**.....102	102	33x4½	No	Own		Electric								None	None	None		8.60			None	None					
Reo.....V	113	33x4½	Yes*	Own		6-3½x5	24.30	G A	3	PS	Ray	N-E	N-E	D-Own	Own	Own	¾ Tim	4.70	E-R	I-R	None	Own	S-55				
Traveler.....108½	108½	32x4	No	Buda	WTU	4-3½x5½	22.50	L B	3	PC	Zen	Eis	Eis	B-L	W-M	Spi	Col		E-R	I-R	None	Gem	S-				
White.....15A	119	34x4½	No	Own		4-3½x5½	22.50	L C	3	Sp	Zen	N-E	N-E	P-Own	Own	Own	½ Tim	5.12	E-R	I-R	None	Own	S-				
Willys Knight.....A	118	32x4½	No	Own		4-2½x4½	21.03	X C	3	PS	Til	A-L	A-L	D-Own	Own	Own	¾ Tim	5.12	E-R	I-R	None	Own	S-				
Yellow.....0-4	109	32x4½	No	Cont	V7	4-3½x5	18.23	L C	3	PC	Zen	Bos	N-E†	D-B-L	B-L	Spi	½ Tim	4.90	E-R	E-T	None	Gem	S-56				
Yellow.....0-7	109	29x4½	SE	Cont	V7	1-3½x5	18.23	L C	3	PC	Zen	Bos	N-E†	D-B-L	B-L	Spi	½ Tim	4.90	E-R	E-T	None	Gem	S-56				

## ABBREVIATIONS—

A—Aluminum  
 Anst—Ansted  
 Ad—Adams  
 A-K—Atwater-Kent  
 A-L—Auto-Lite  
 B—Semi Steel  
 Bal—Ball & Ball  
 B & B—Borg & Beck  
 B-F—Both Internal and External Four Wheels  
 Bij—Bijur  
 B-L—Brown-Lipe  
 Bio—Blood  
 Bos—Bosch  
 C—Cast Iron  
 Car—Carter  
 Chi—Chimax  
 Col—Columbia  
 Con—Connecticut  
 Cont—Continental  
 D—Multiple Disk  
 Del—Delco  
 Det—Detroit  
 De J—De Jon

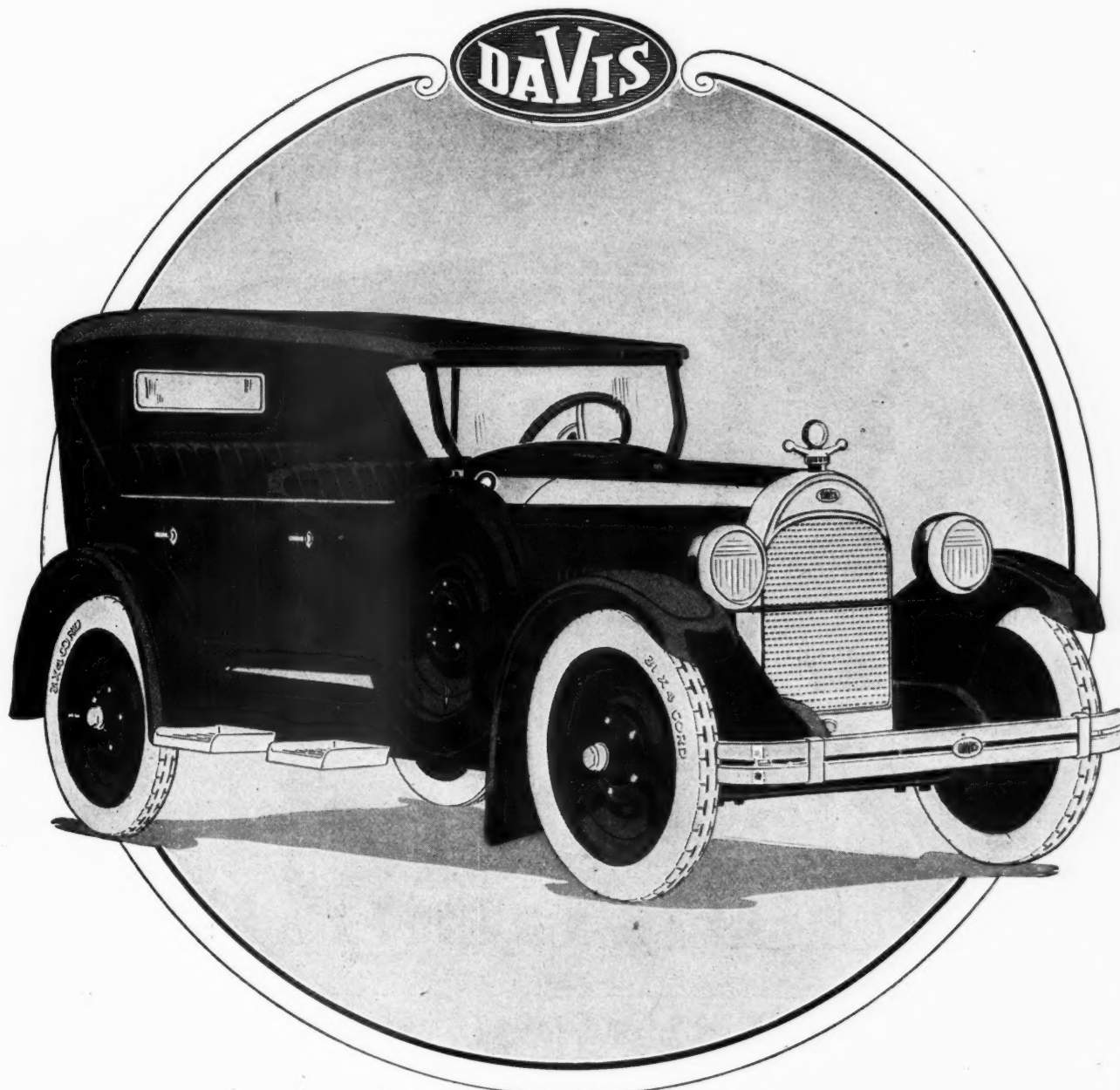
Dit—Ditwiller  
 Doo—Dooley  
 Dtl—Detlaiff  
 Dues—Duesenberg  
 Dur—Durstion  
 Dyn—Dyneto  
 E—Full Elliptic  
 E-F—External Four Wheels  
 E-T—External Transmission  
 Eat—Eaton  
 F—Full Floating  
 Fall—Falls  
 FH—Flint  
 FP—Full Pressure to all bearings including wrist pins  
 Ful—Fuller  
 1/2 F—Semi-Floating  
 3/4 F—Three-Quarter Floating  
 G—Head and Side  
 G-D—Gray & Davis  
 Gem—Gemmer  
 G-L—Grant-Lees  
 Goo—Goodrich  
 H—Horizontal  
 Har—Hart

Hol—Holley  
 Hoo—Hoosier  
 H-Sp—Herschell-Spillman  
 Hyd—Hydraulic  
 I—In Head  
 I-F—Internal Four Wheels  
 I-R—Internal Rear Wheels  
 J—Three-Quarter Elliptic  
 Jac—Jacox  
 Jax—Jaxon  
 Joh—Johnson  
 Jon—Jones  
 K—Cone  
 Kin—Kingston  
 L—L Head  
 Lav—Lavine  
 Lon—Long  
 L-N—Leece-Neville  
 Lye—Lycoming  
 M—Metal  
 Mar—Marvel  
 M & E—Merchant & Evans  
 Mec—Mechanics  
 Mons—Monson  
 Mun—Muncie

N—Platform  
 Non—None  
 N.E.—North East  
 Nor—Northway  
 O—Special Type  
 P—Single Plate  
 PC—Pressure to all Crankshaft and connecting rod bearings  
 Pen—Penfield  
 Pet—Peters  
 PS—Splash with Pressure  
 Q—Quarter Elliptic  
 R—Fabric  
 Ray—Rayfield  
 Rem—Remy  
 Roc—Rockford  
 Ros—Ross  
 S—Semi Elliptic  
 Sal—Salisbury  
 Sch—Schleber  
 Sco—Scoe  
 Sne—Snead  
 Sp—Splash  
 Spe—Special  
 Spl—Spicer

Spl—Splitdorf  
 S.E.—Standard Equipment  
 Sta—Standard  
 Ste—Stewart  
 Str—Stromberg  
 T—T Head  
 The—Thermoid  
 Thi—Thiener  
 Til—Tillotson  
 Tim—Timken  
 Uni—Universal  
 V—Cantilever  
 W-G—Warner Gear  
 W-M—Willis-Morrow  
 Wag—Wagner  
 War—Warner  
 Weid—Weidely  
 Wes—Westinghouse  
 Wis—Wisconsin  
 X—Sleeve  
 Zen—Zenith  
 \*—Electric  
 †—Gear Only  
 \*—Extra Cost  
 ‡—On Phaeton models





THE DAVIS PHAETON

Model 71 - \$1395

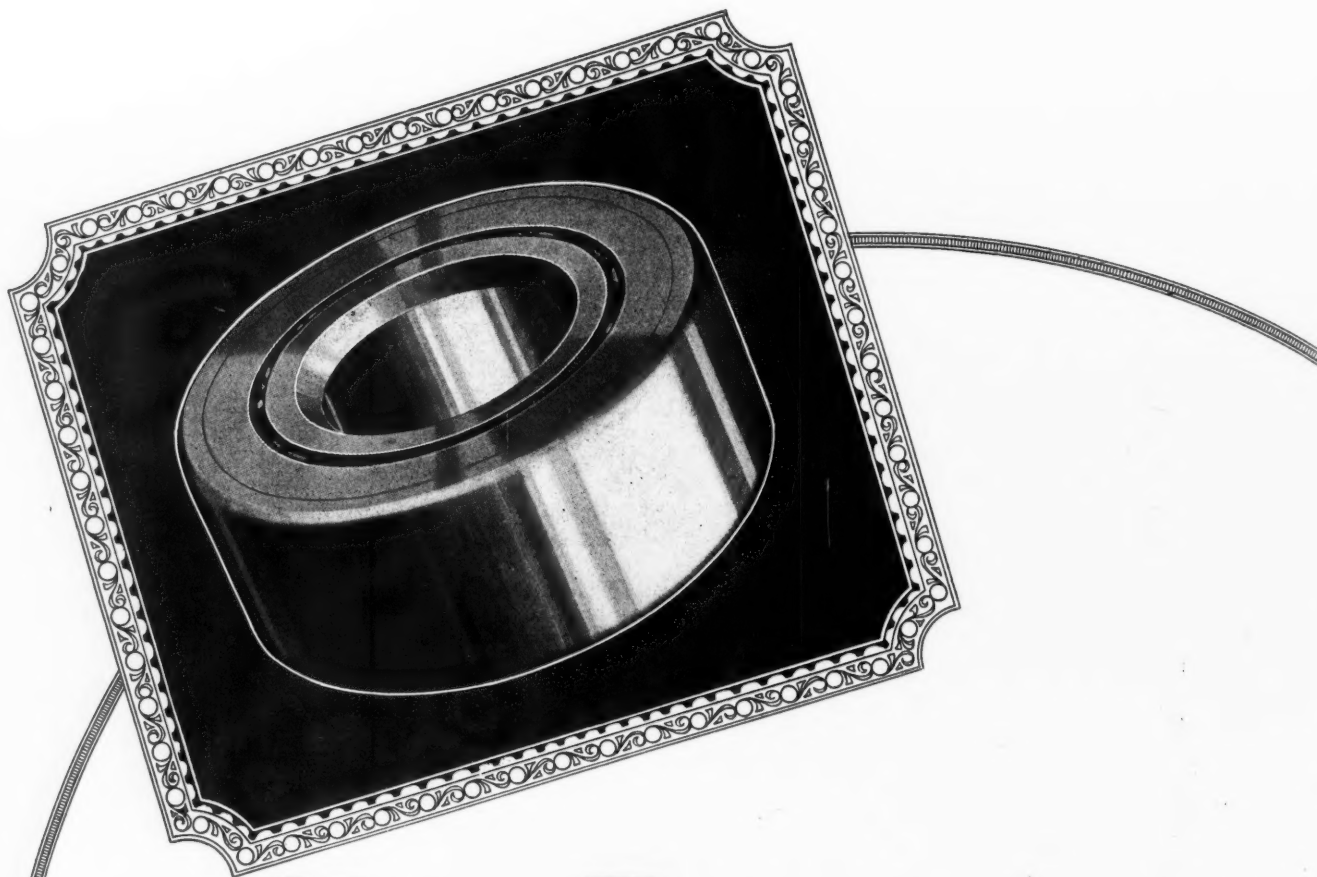
—at the factory, plus tax

Distinguished by its performance, as by its appearance, the Davis Phaeton is an ideal open car for those persons of good taste who are seeking more than mere transportation. Light, perfectly balanced —with the charm of individuality—the Davis fills a well-defined demand in the field of high-grade, moderate-priced cars.

GEORGE W. DAVIS MOTOR CAR COMPANY . . RICHMOND, IND.

# DAVIS

"BUILT OF THE BEST"



# New Departure Ball Bearings

**I**N choosing an anti-friction bearing, consider how much of its maker's output goes to *replace* those which outlive their usefulness. That is a fair index of what *you* will have to replace.

The New Departure plants make 80,000 ball bearings a day, yet considerably more than 99% of these ball bearings go into *new* installations—less than one in every hundred ever have to be replaced.

New Departures outlive the mechanism they serve without appreciable wear. They outsell because they excel.

---

THE NEW DEPARTURE MANUFACTURING COMPANY  
Detroit BRISTOL, CONN. Chicago



# Every Baker in Your Territory is a Live Prospect for this Body



Martin-Parry  
Prices  
have no  
competition

*Used by Bakers, Confectioners, Druggists, Florists, Shoe Dealers, Clothing Stores and Laundries*

Martin-Parry advertising is arousing interest which you can readily convert into profitable sales.

In the May 31st issue of The Saturday Evening Post, the special advantages of this Martin-Parry Body are described for the benefit of Bakers and their customers who want the best possible delivery service.

Link up with this advertising now. Call on all the Bakers in your territory while their interest is still

keen. Show them a copy of the "POST" carrying the Martin-Parry advertisement for Bakers.

Then continue down the line from Confectioners to Laundries. Every Martin-Parry Body you sell is a builder of goodwill for you and your chassis.

Write us for full particulars of the Martin-Parry Plan. It is helping commercial car dealers to sell more bodies and chassis. Address Sales Promotion Department.

MARTIN-PARRY CORPORATION, General Offices: York, Pa. Factories: York, Pa.; Indianapolis, Ind.; Lumberton, Miss.

MARTIN-PARRY NATIONAL  
ASSEMBLING AND  
SERVICING BRANCHES



LARGEST COMMERCIAL  
BODY BUILDERS  
IN THE WORLD

## Martin-Parry Commercial Bodies

A STANDARDIZED LINE OF FORTY COMMERCIAL BODIES FOR EVERY BUSINESS NEED

### Assembling Plants

Albany, N. Y.  
Atlanta, Ga.  
Baltimore, Md.  
Boston, Mass.  
Buffalo, N. Y.  
Chicago, Ill.  
Cleveland, O.

Dallas, Tex.  
Detroit, Mich.  
Flint, Mich.  
Houston, Tex.  
Kansas City, Mo.  
Kearney (Newark), N. J.  
Long Island City, N. Y.

Los Angeles, Cal.  
Memphis, Tenn.  
Milwaukee, Wis.  
Minneapolis, Minn.  
New Orleans, La.  
New York City, N. Y.  
Oakland, Cal.

Philadelphia, Pa.  
Pittsburgh, Pa.  
Portland, Ore.  
San Francisco, Cal.  
Seattle, Wash.  
St. Louis, Mo.  
Toledo, O.

### Other Distributing Points

Akron, O.  
Charlotte, N. C.  
Columbus, O.  
Denver, Colo.  
Jacksonville, Fla.  
Laredo, Tex.  
Mobile, Ala.  
Nashville, Tenn.  
New York City, N. Y.  
Oklahoma City, Okla.  
Pittston, Pa.  
Richmond, Va.  
Salt Lake City, Utah.  
Springfield, Mass.  
Washington, D. C.

# GATES BELTS

*"The Standardized Fan Belt"*

When you say "This fan belt has outsold all other kinds of fan belts for 8 consecutive years" you have given Gates Vulcos the strongest recommendation a fan belt could have.

Made by the World's Largest  
Manufacturers of Fan Belts.



## THE BEST ACCELERATOR FOR FORDS



## Profits

Your real profits depend on customer satisfaction. When you recommend BULL DOG FOOT ACCELERATORS to Ford Owners—you not only make a good profit on every sale—but you are sure your customers are going to get genuine satisfaction.

Bull Dogs have proven their worth on more than a million Fords. Their smooth, positive, easy action—their uniformity in construction—their adaptability to all Fords and Ford Carburetors—their reasonable price are reasons why they sell so quickly everywhere.

*The Retail Price is \$1.50 (\$1.90 in Foreign Countries). Leading wholesalers everywhere sell and recommend them.*

## BULL DOG SPRING ASSORTMENTS



Two new Bull Dog Money makers for Dealers. Bull Dog Spring Assortments—30 useful springs packed in an attractive screw top container. List at 10c each. Bull Dog Rubber Accelerator Pedals—replace metal pedals on many cars. Furnished 12 on an attractive counter display card in colors. A wonderful seller at 25c each.

## BULL DOG ACCELERATOR PEDALS



THE W. H. THOMAS MANUFACTURING CO., SPENCER, IOWA

# Nims magic!

When a man steps out on the stage and pulls a rabbit or two out of a silk hat, that's magic all right.

But that kind of magic doesn't make you any money.

When though, you sell a man a Nims Pump for his Ford for \$5.00—

A pump small in size but giant in power—efficient enough to keep any Ford from getting hot under the hood—and any Ford driver from getting hot under the collar—

A water pump husky enough to last as long as the good Ford car itself—a pump that's free from all the grief and trouble that improperly designed Ford pumps always have—

That man will say it's magic.

And the kind of magic you work when you sell a Nims Pump is the kind that makes you real money—considerable more than \$1.50 on every sale.

And, Nims news spreads like magic. Every Nims Pump you sell will sell from six to a dozen more Nims Pumps for you. At least, that's the way it usually works.

Why, take a town like Phoenix, Arizona. One dealer there put out 40 Nims Pumps in 1922. In 1923 he put out 400. Goodness knows how many he'll sell this year!

That's the beauty of handling a good Ford Pump like the Nims. You make money on it the first year. And every year, your business grows by leaps and bounds.

None of this stuff of making sales the first year—and making alibis the second year, when you sell a pump for Fords like the Nims.

The Nims Pump is a patented pump. No other Ford pump can be like it.

It can't leak. It holds lubrication. It doesn't change or alter fan belt, fan pulley or fan adjustment in any way.

Less than a twentieth of a horsepower operates it. It helps the Ford thermo-syphon cooling system—doesn't block it. (That's a point

you want to consider mighty seriously when you buy Ford pumps.)

You can make friends and you can make money by selling Nims Pumps.

That's what you want to do isn't it?

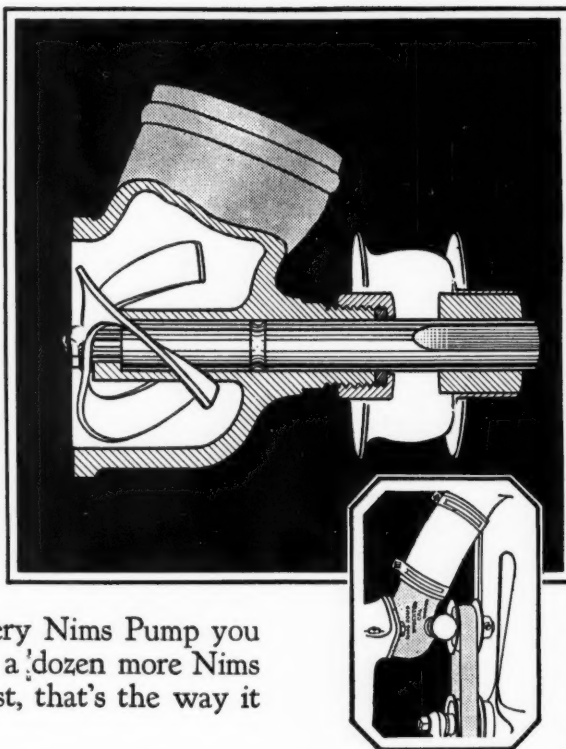
All right. Order six Nims Pumps from your jobber NOW.

Put one on any Ford that's handy. Ramble up the hills. Buck through sand. Plough into a stiff, hot, head wind.

If then you're not a hundred percent sold, write us. We'll take the pumps off your hands and see that you get your money back.

That's fair enough, isn't it?

Jot it down so you won't forget—to order six Nims Pumps from your jobber today.



## NIMS PUMP COMPANY

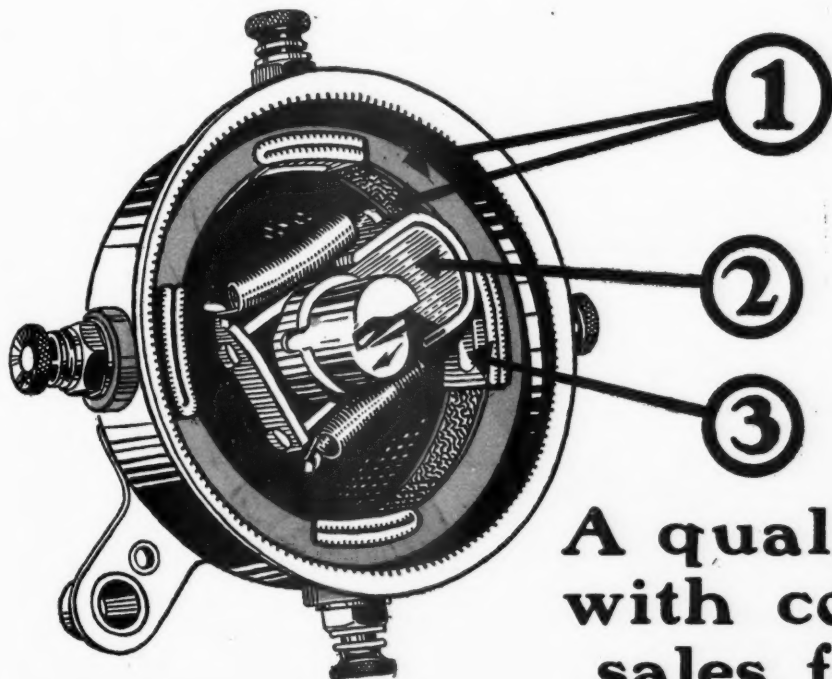
Main Office and Factory

STOCKTON, CALIFORNIA

Office and Warehouse: 120 N. CAMAC STREET  
PHILADELPHIA, PA.



# "IT WORKS LIKE A CLOCK"



Hard fibre wall packed with cushion felt, providing a practically frictionless raceway for the rotor to travel over.

The felt pads take up the oil and present constant lubrication. Provides a soft, smooth surface for the rotor.

Eliminates wear.

Reversible rotor with compensating springs gives perfect contact at all speeds. This rotor is keyed for the pin on both surfaces.

Contact points are of hardened steel and give a broad, sure-fire contact surface at every revolution.

## A quality timer with compelling sales features—

**OTHER FEATURES:** The "Spit-Fire" Reversible Rotor is also a Replacement Rotor for all race type timers used on Ford Cars. If one side of broad faced rotor becomes worn from use, the rotor is easily reversed, giving double life service—a distinct feature and a sales point of decided advantage.

No bearings or rollers to wear or burn. A really remarkable replacement rotor with a quick, profitable turnover.

List 50c. Liberal trade discounts.

**H**ERE is a timer built along strict quality lines at a price that gives it a most decided sales advantage.

Its new design, combining a double life reversible rotor and lubricated cushion felt raceway, lends it additional sales value.

Mosler "SPIT-FIRE" Timer has every virtue of the high priced timer yet it is priced to insure a quick turnover.

Backed by the Mosler policy of fair dealing, this new quality "SPIT-FIRE" Timer with its distinct and exclusive features promises to set new sales records.

Complete, including Rotor, Washer, Pin and Thumb Nuts. Ready to install, \$1.25. Liberal trade discounts.

Your jobber will supply you with Mosler "SPIT-FIRE" Spark Plugs and the New "SPIT-FIRE" Reversible Rotor Double Life Timer. If he is out of stock, we will ship direct to you and bill him. Act today.

MOSLER METAL PRODUCTS CORP.

Mt. Vernon, N. Y.



6 sizes fit every car on the market—

This means a smaller investment in your plug stock and a rapid turnover.

Further—the Red Protector Cap eliminates accidental breakage of the porcelain.

"SPIT-FIRE" Spark Plugs represent genuine spark plug value backed by the Mosler method tested by 24 years' spark plug manufacturing experience.



Mosler  
**Spit Fire**  
Spark Plug

Mosler  
**Spit Fire**  
Timer



**"My Business has increased 30%"**

"In spite of keen competition my business is showing a profitable increase of 30 per cent since I installed the AIR-O-METER. My customers are showing their appreciation for this service by buying their gas, oil and supplies from me."

This is only one case in hundreds. THE AIR-O-METER NOT ONLY BRINGS NEW CUSTOMERS BUT ALSO KEEPS THEM COMING!

## Correct Air Pressure Automatically!

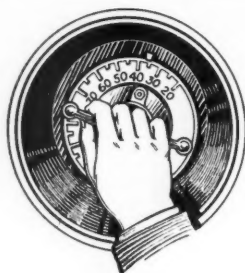
CORRECT AIR PRESSURE for tires is absolutely necessary, as over-inflation or under-inflation will greatly reduce the life of the tire. The AIR-O-METER delivers air in CORRECT AMOUNTS. A light appears and burns constantly as air goes into the tire—air shuts off AUTOMATICALLY and

light goes out when EXACT amount is reached.

The AIR-O-METER is a dependable device, is easily installed and requires no attention. Built in various styles and sizes to meet every requirement. Write at once for full information.

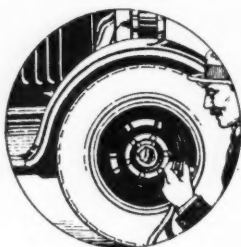


**The Mattman & Sinclair Co., Cincinnati, Ohio**



**ONE!**

Merely turn the handle to the EXACT amount of pressure desired.



**TWO!**

Apply hose to tire valve stem...light burns constantly as air is being delivered. Air stops AUTOMATICALLY when desired pressure is reached...light goes out.



**THREE!**

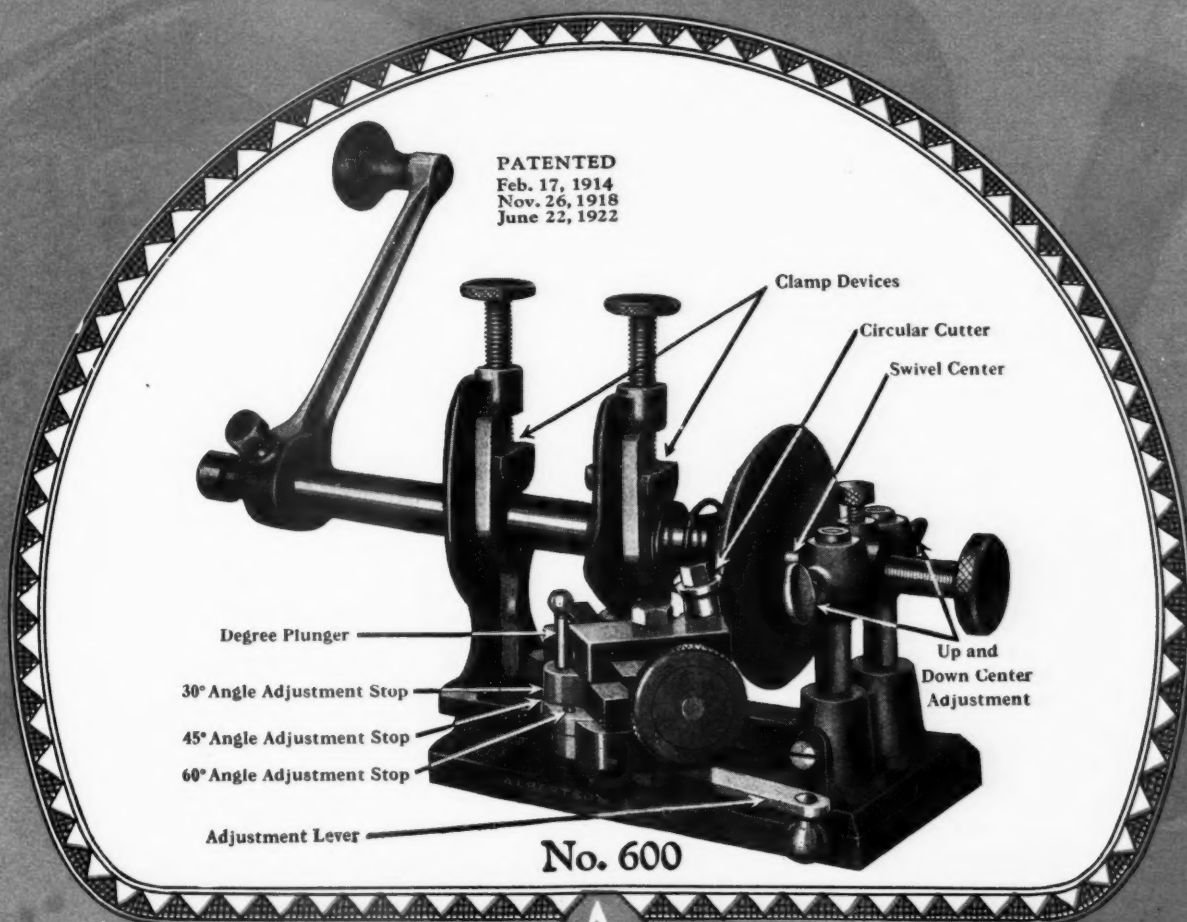
You are off in a minute—KNOWING that you have EXACT amount of air in your tires.



# Air-O-Meter







**F**OR REFACING *big* valves or small ones — any valve from  $1\frac{3}{8}$  to  $4\frac{1}{2}$ " diameter, 30°, 45° or 60° angle, — the Sioux Valve Lathe is speedy, efficient and accurate — more accurate than a machine lathe. So simple a novice can operate it. No tedious adjustments. Cutter cannot get out of line. Round cutter insures smooth face on any steel or cast iron valve, without chattering or leaving ridges. Valve is self-centering in lathe. Clamps hold valve in alignment. Lathe will fasten permanently to bench or fit into a vise.

## SIOUX VALVE LATHE

Your Jobber Sells It

ALBERTSON & CO.

SIOUX CITY, IOWA



The Best-Equipped Shop  
Gets the Business



**Bethlehem  
"C" Special**

List Price, \$2.75

*As illustrated. Complete with ratchet handle, bar handle, and extension bar. Eight sockets, ranging from 5/16" to 3/4". Neat, snug fitting metal box.*

**For Mechanics  
The Type D Set**

*Takes care of smallest generator nut up to the largest nut on any car. Has 23 deep sockets, regular L-handle, T-handle, drop forged ratchet handle, three short bars and universal for close clearances. Packed in a husky box. List price \$12.50*



## A Favorite with Motorists

**A** FAVORITE with the motorist who likes to work with real mechanics' tools. The Bethlehem C Special gets right to the spot—specially designed to get to the hard to reach nuts without cramping or twisting. The thin walled socket finds no interference. The extra deep socket fits and holds. Case hardened to take the strain.

Comes complete with 8 sockets, ratchet wrench—hex bar handle and short bar—all in a neat substantial metal case. Takes care of most nuts on any car.

Accessory dealers are cleaning up at modest price of \$2.75 each. Order a sample set for your own use and get the discounts.

BETHLEHEM SPARK PLUG COMPANY, Inc.  
BETHLEHEM, PA.  
E. H. Schwab, President.

# BETHLEHEM WRENCH SETS

BETHLEHEM Spark Plugs

BETHLEHEM Radiator Caps





"Beauty  
on Duty"

### Remember!

The Monogram Junior Cap will accommodate either 7/16 in. or 5/8 in. diameter meter stem without extra cost.

**MONOGRAM**  
ORIGINAL  
SELF LOCKING RADIATOR CAP

Color!—

to let you see the color of their Money

Fascinating as the brightest trout fly are Monogram New Color Shields. They lure in customers. They land more sales. They hook extra profit. Only Monogram dealers have this array of special shields to offer. Rich colors in the best of taste on finest cars. Faithful reproductions of fraternal and other emblems, on gold-

color shields. Shields with personal initial combinations — just what patrons want.

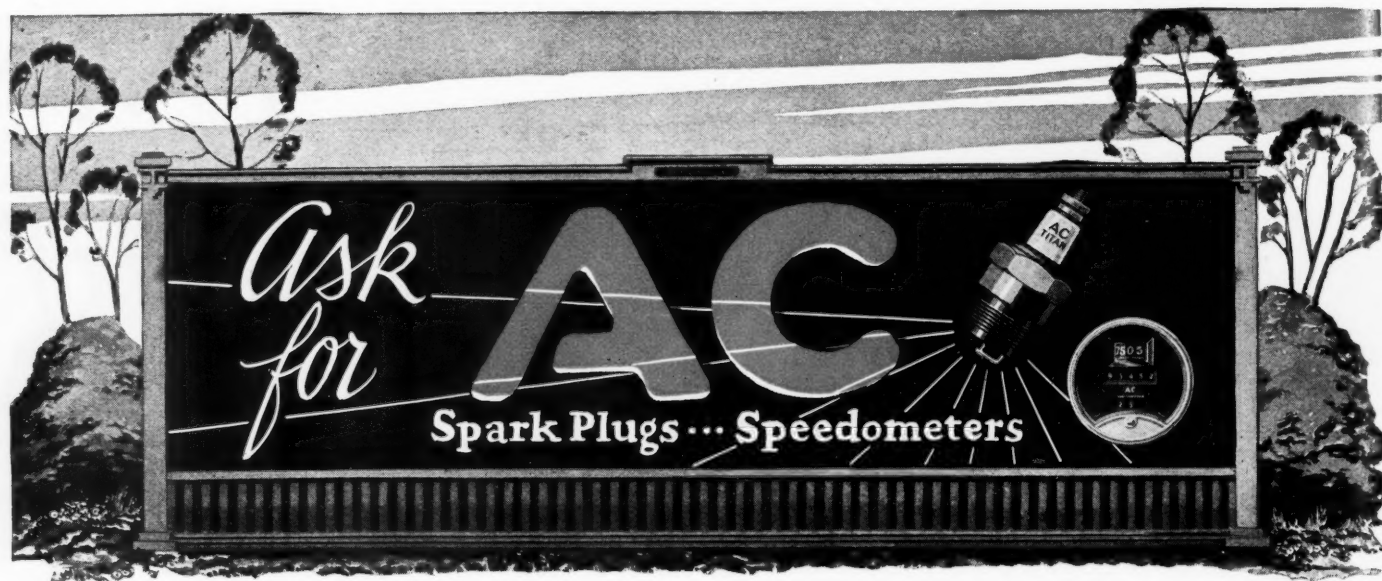
And the ingenious Monogram Illustrated Order Book, obtained through your Monogram distributor, makes it sure and simple to suit every buyer perfectly, though you need no costly extra stock.

Monogram, with its great beauty, protection, and utility, has become the *custom* radiator cap! Monogram dealers have a new, exclusive advantage. Keep up with Monogram and you keep ahead.

GENERAL AUTOMOTIVE CORP'N  
600 W. Jackson Boulevard  
CHICAGO

# MONOGRAM

Original Self Locking Radiator Cap



## These Painted Boards Are Working For You Everywhere—Every Day

All over America—wherever motorists travel—big, impressive painted bulletins advertising AC Spark Plugs are working every day for the dealer who stocks AC's.

National magazines, trade papers, store signs, direct mail advertising are continuously circulating millions of AC messages throughout the country—and newspapers too are spreading the story of AC superiority.

All this effective advertising, backed up by the factory equipment business of over two hundred manufacturers of cars, trucks and tractors, not only creates an assured market for the dealer, but makes AC's the best known and easiest selling spark plugs to stock.

Likewise they are the most profitable.

AC Spark Plug Company, FLINT, *Michigan*

*Makers of AC Spark Plugs—AC Speedometers*

U. S. Pat. No. 1,135,727, April 13, 1915; U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending



Reproduction of one of the AC 1075 Ads in The Saturday Evening Post

# A good plug for Fords!

# AC 1075

Here is why the AC 1075 is a good plug for Fords

## Spring Terminal Clip

makes it easy to test plug or coil while motor is running and locks nut so that it will not unscrew. There is no danger of damaging connection through use of pliers as the clip keeps it tight.

## Heavy Body Porcelain

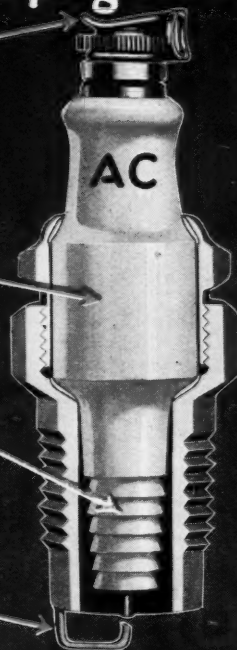
to withstand hard service—plug comes apart by unscrewing bushing.

## High Temperature Fins

Plugs become shorted by deposits of carbon. The thin edges of the fins on the patented carbon proof porcelain get hot quickly and burn away the deposits, thus preventing accumulation of carbon.

## Heavy Electrode

designed to form natural drain so no oil will lodge in spark gap.



INSTALL A SET OF AC 1075's TODAY—YOUR MOTOR WILL PERFORM BETTER

AC Spark Plug Company, FLINT, Michigan

Makers of AC Spark Plugs—AC Speedometers

U. S. Pat. No. 1,135,727, April 13, 1915; U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending

*How the AC 1075 is being advertised in national publications to the Ford owner*

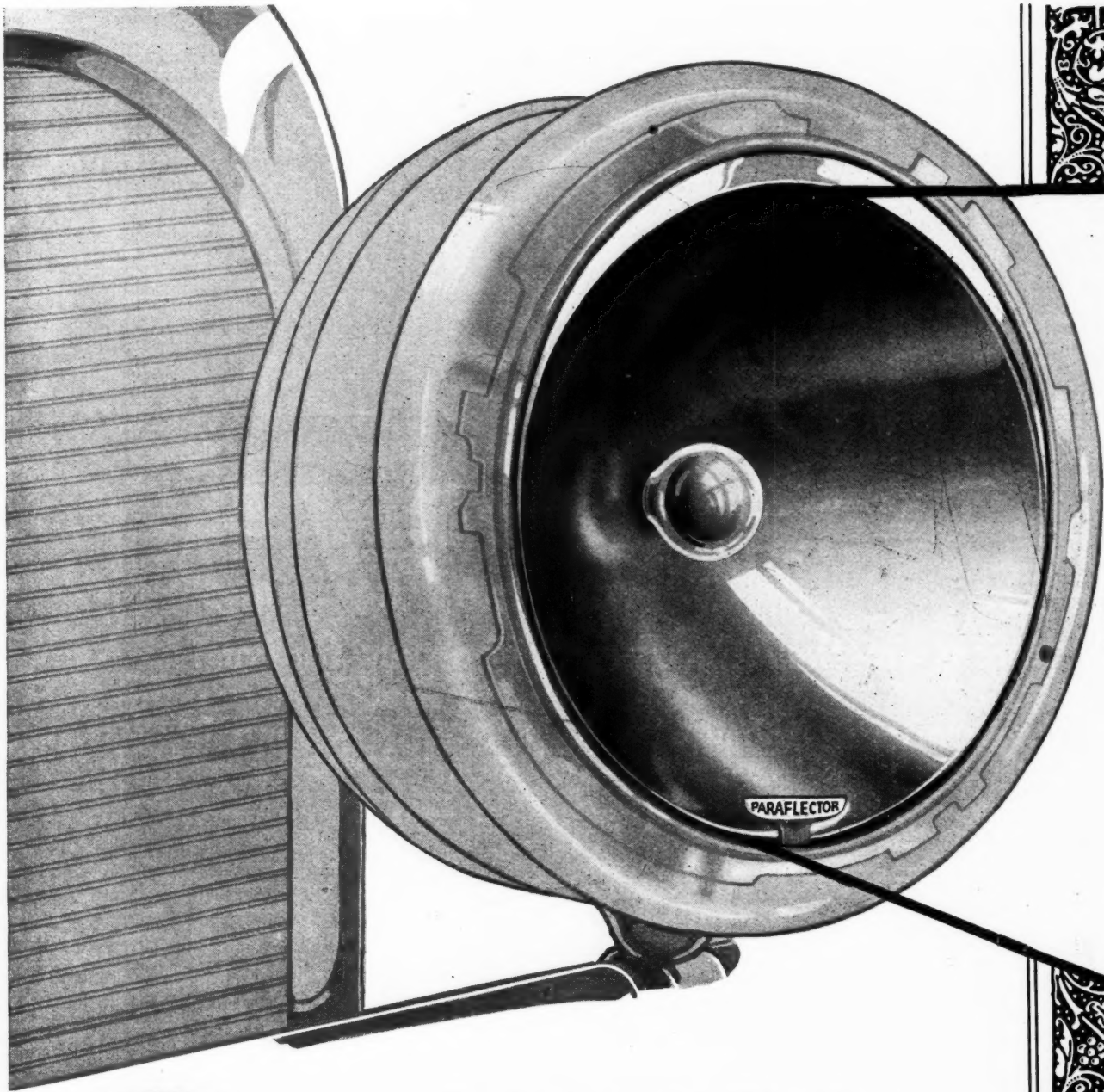
Thousands of dealers are building a big, profitable spark plug business among Ford owners on the AC 1075—a better plug for Ford engines—and you make a larger profit on them.

Write us for the attractive fibre poster, in colors, of the above advertisement which we have for you—to connect your store with this impressive AC advertising.

AC Spark Plug Company, FLINT, Michigan

Makers of AC Spark Plugs—AC Speedometers

U. S. Pat. No. 1,135,727, April 13, 1915; U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending



## This Flash Display Gets the Business

This sturdy display board is cut out for installation of headlight with Paraflector and is equipped with a flash switch. A wonderful window attraction. A convincing demonstrator for show room or service station.

# PARAFLECTOR

"Daylight Driving At Night"



*The*

Top Line of the Bright Zone of Light is as Straight as a Die. Level For its Entire Length—3 Feet Above the Road—Full Brilliancy 500 Feet and More.



## 30 Million Paraflector Market Get Ready—

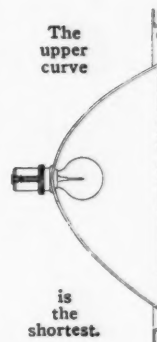
Millions of motorists have been disgusted with their headlights or the headlights of approaching cars. When they dim they throw themselves into darkness to which their eyes are unaccustomed. The danger is nerve-racking.

Everyone has looked for a remedy for this menace to night driving. Here it is—**Paraflector**, the one reflector that puts **all** the light where you want it—without glare—without danger.

PARAFLECTOR means a gold mine opportunity to Distributors, Service Stations, Accessory Dealers and new Car Dealers. There are 15 Million cars in operation—30 Million Headlights. This is the huge replacement market waiting for you.

Our plan of **Headlight Inspection** brings the car owner to you and shows him **what is wrong**.

Our display and demonstration of PARAFLECTOR shows him **WHAT IS RIGHT**.



## Level Slices of Daylight

The Paraflector concentrates the light rays about a common focus point—multiplying them many thousand times and projecting this intense brilliancy **STRAIGHT AHEAD** at the **HEIGHT OF THE HEADLIGHT**—AND **NO HIGHER**. You get the benefit of all the light—through a clear glass—without hitting the approaching driver or pedestrian **IN THE EYE**. It's all in the patented reflector. Paraflectors are made for all cars. We furnish clear glass with each Paraflector.

**The PARAFLECTOR Co.**

1115½ Security Building  
MINNEAPOLIS, MINN.

Exclusive Distributor territories are rapidly being assigned—Don't wait! Dealers are already ordering direct. Write or wire today for our complete proposition.

**THE PARAFLECTOR COMPANY,**  
1115½ Security Bldg., Minneapolis, Minn.

You may send me at once full particulars of the **PARAFLECTOR OPPORTUNITY**

Name.....  
Address.....  
City..... State.....

CHECK

☐

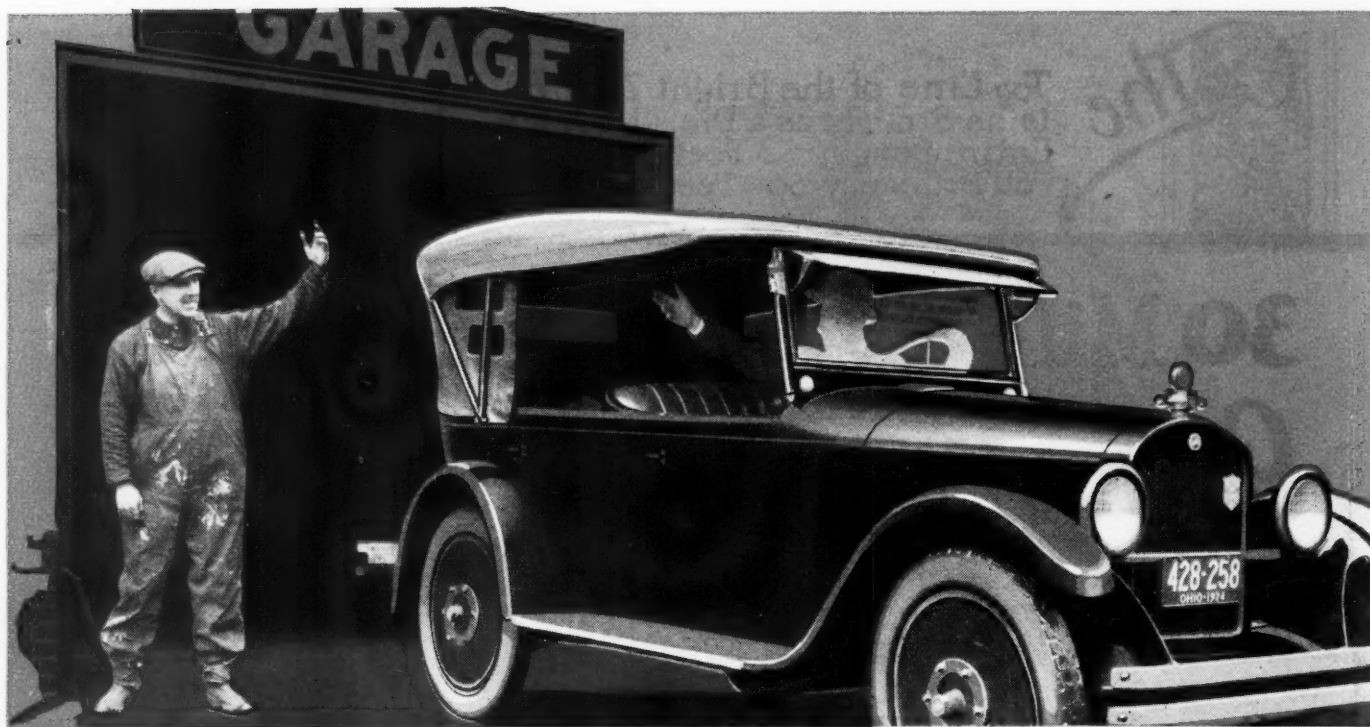
DEALER

CHECK

☐

DISTRIBUTORS





# Ready When Promised!

## That's Why This Garage Man Gets the Business

This garage man has a reputation that pays dividends. Car owners know they can bring a car with a broken spring to him, get a promise of quick delivery, *and depend upon him* to meet it. Naturally, his business grows, for that's the kind of service car owners boost.

What's the secret? Whenever a spring is needed, he telephones a Detroit Spring distributor near him. In no time at all, the spring he wants is delivered. He identifies it as a genuine spring by the "D" raised on each clip bolt head and stamped on the short plate. He knows that it will fit. He knows that it's "built to the car maker's specification." Then it's a simple matter to put it in place because it is an exact duplicate of the original — in length, camber, kinds of steel, alloy or carbon, number of leaves, etc.

### You, Too, Can Get Detroit Springs Quickly

You, too, can build a reputation for quick service, for having jobs *ready ahead of time*. There's a Detroit distributor near you who can deliver any spring you want, in a hurry. All you need is a Detroit price list and a telephone.

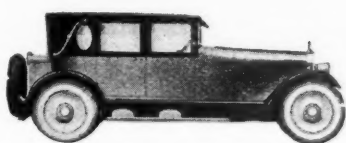
DETROIT STEEL PRODUCTS CO., 2268 E. Grand Blvd., Detroit, Mich.

Now You Can  
Identify  
Detroit Springs



**BUILT TO THE CAR MAKERS' SPECIFICATIONS**





*Four Passenger*

*Brougham*

*\$2750 at Warren, O.*

*A perfectly appointed closed car of beauty, comfort and good taste. Ample leg room—no crowding. Built-in suit case carrier and two suit cases. Automatic windshield cleaner. Perfection Heater.*

**OTHER MODELS**

4 Pass. Sport . . . . .	\$2250
5 Pass. Sedan . . . . .	2800
5 Pass. Phaeton . . . . .	2150

## Thanks to Pete Sterling

**T**HIS is Pete Sterling's pet engine because it embodies all the pet ideals and improvements which the famous "sleeve valve" expert believes essential to the best performance.

Thanks to Pete Sterling, the Sterling-Knight car boasts a six cylinder "Knight type" engine which in every way rates with the power plants of America's finest and most costly cars—excepting none.

This engine runs like velvet—sweet and smooth.

It has ample power—It has amazing flexibility.

And like most Knight-type engines, it runs better the longer it runs.

The Sterling-Knight—so powered—and with its other star features such as the **SHOCK INSULATORS**—fills an important place in today's market.

With the Knight enthusiasts (there are many of them) it fits into the picture like the sunrise—and no prospect, having sat at its wheel, can avoid giving it serious consideration.

Ask for the franchise details today.

**The Sterling-Knight Company**  
Warren Ohio

# STERLING KNIGHT

*The popular priced Knight Six*



If you don't already have a Packard Wiring Chart, mail that coupon to us today.

## A Constructive Help When You "Fix 'er Up"

Whether you are rewiring car or truck, simply refer to the alphabetical list on the Packard Chart and after the car name you find the proper high or low tension ignition cables; the proper lighting cable for head lamps, tail lamps or other lamps; the battery and starter cable, and the generator to battery cable.

Out of a total of 162 cars and trucks, Packard Cable is a standard specification for 116, hence in the majority of cases you will be replacing with the make of cable originally installed in the car. The Packard Wiring Chart makes it easy, and Packard Cable assures satisfaction. It is a unit of good repute.

*The Packard Electric Company*  
WARREN, OHIO

### COUPON

The Packard Electric Company  
Warren, Ohio.

Mail me FREE Packard Wiring Chart described in Motor Age.

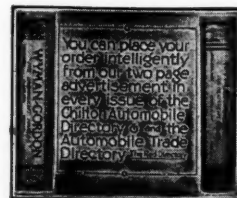
Name .....

Address .....

City .....



**[CATALOGED]**  
in the Red Directory





# Tell them that getting ahead with a Ford—

## is a matter of getting a WELCO FORD FOOT ACCELERATOR!

Show those Ford owners how they can speed up without taking their hand off the wheel to use the hand throttle! Take a minute to explain how easily the Welco Ford Foot Accelerator can be installed by them, by simply drilling one hole thru the floor board and it's ten to one you'll sell 'em! Ford owners want this driving convenience and its moderate cost eliminates sales resistance when you come to close your prospect. Our new counter demonstrator will help you effect quick turnover on this drawing card and the profit makes it worth your handling. Stock the Welco Ford Foot Accelerator now! Ask your jobber to supply you.

Well constructed and finished in full Nickel Plate. Adjustable to any desired idling speed. Furnished with foot rest for comfort. Packed in attractive carton, fully assembled with instructions and diagram for installing.

The Welco "Glare-Stop" Shield, at \$1.00 each, and Welco "Neva-Lost" Gas Tank Cap, new price \$1.50 each, are other sales boosters you should inquire about. Watch for future advertisements on these two Welco products.



The above illustration shows how easily the Welco Ford Foot Accelerator is applied directly to the side of the motor. This ease of application is a feature that helps sell them.

# \$1<sup>50</sup>

TRADE MARK

**Welker-Hoops Mfg. Co.**  
Middletown, Ct.

**WELCO ACCESSORIES**

IF IT'S

# PARANITE

IT'S RIGHT



## When *good* electric cables cost so little, why use anything else?

Good Dealers, Service Stations and Repair Shops have come to realize fully that, with labor costs at their present high levels, it is not sensible to jeopardize their reputation for doing good work.

Everywhere, the principle of charging a good price for a good job is gaining favor. And to such a degree is this true, that the quality of materials and parts used in most shops was never better than it is today.

To repeat—when good cable costs so little, why use anything else?

Leading Jobbers everywhere carry complete stocks.  
Your Jobber can deliver it to you.

### Indiana Rubber & Insulated Wire Co.

Jonesboro, Indiana

A. J. Musselman  
549 W. Washington St.  
Chicago, Illinois

Geo. R. Hall  
West Hartford, Conn.



*Making Good Cable in Jonesboro for more than 34 years*





## The New Robert Bosch Franchises



are an indestructible asset for every  
Distributor                      Service Station  
Dealer                              Garage Owner  
Repairman

Robert Bosch Magneto — a type for every engine. Over three million in use.

The Robert Bosch Horn—the Last Word in Warning Signals. To Hear It Is to Want It!

Robert Bosch Long-life Spark Plugs—famous for the fat white hot spark. Black body, white "Steatite" insulator.

Generators  
Magneto Generators  
Fordson Magneto Attachments  
Ford Magneto Attachments  
Starters  
Switches  
Hydrometers for Radio Batteries  
Impulse Couplings, etc.

These Franchises cover the sale or servicing of the famous Bosch Products, known by the full name of their originator—Robert Bosch, and sold the world over since 1887.

The good will of millions of users is back of these Products.

You can share in the unusual sales power and substantial profits offered by the Franchise best suited to *your* individual needs.

Send at once for a copy of our book — "The New Robert Bosch Franchises" — containing interesting information regarding the new Bosch Sales Plan, the Bosch Distributing System and Bosch Co-operation.

### ROBERT BOSCH MAGNETO CO., INC.

OTTO HEINS, President

109 West 64th Street

New York

Chicago Branch: 1302 South Wabash Avenue

Sales and Service Stations in Principal Cities the World Over

The genuine, *original* Bosch means Robert Bosch only



*Typical of thousands of Buick dealer establishments all over the country*

## Buick Assures Continued Prosperity

**B**UICK dealers continue to remain Buick dealers. Check this by your own observation. They have been prosperous in the past—Buick's dealer policy and Buick cars assure their prosperity for the future. Buick is now well on its way to the manufacture of its two-millionth motor car—a record unapproached by any other manufacturer of finer motor cars. Why not have your name on file?

**BUICK MOTOR COMPANY, FLINT, MICHIGAN**

*Division of General Motors Corporation*

Pioneer Builders of Valve-in-Head Motor Cars

Branches in All Principal Cities—Dealers Everywhere

---

**WHEN BETTER AUTOMOBILES ARE BUILT, BUICK WILL BUILD THEM**

---





# QUIET

**Q**UIET operation has always been one of the outstanding features of Hyatt Quiet Roller Bearings. And now, in the Hyatt New Series Bearings, this distinctive and highly desirable feature is even more pronounced.

The quiet performance of motors, axles and transmissions equipped with Hyatt New Series Roller Bearings, contributes very materially to the lasting quiet performance of the cars in which they are used.

Manufacturers are better able to meet the requirements of consistent quiet operation through the use of Hyatt Quiet New Series Roller Bearings for supporting shafts and gears.

## HYATT ROLLER BEARING COMPANY

NEWARK    DETROIT    CHICAGO    SAN FRANCISCO  
HUNTINGTON, PHILADELPHIA, PITTSBURGH, MINNEAPOLIS  
WORCESTER, BUFFALO, CLEVELAND, MILWAUKEE

*The  
New Series*

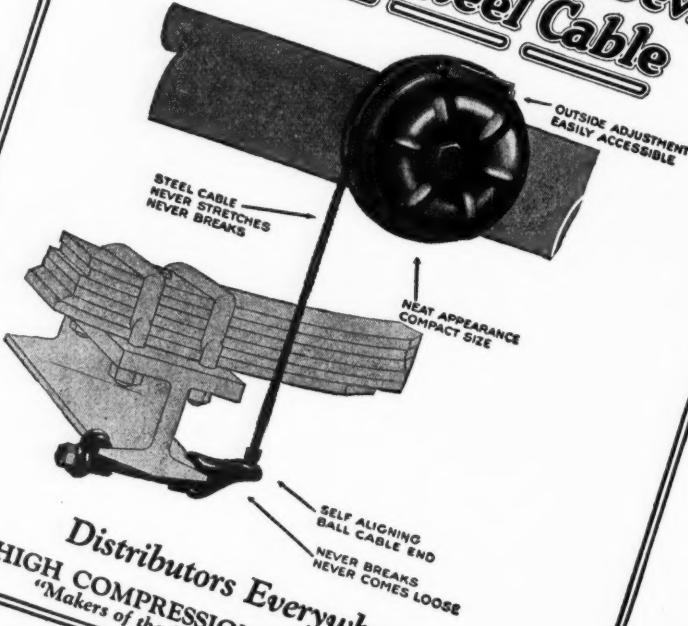
# HYATT

*Quiet*  
**Roller Bearings**

# THE SATURDAY EVENING POST

June 7th  
Issue

**BURD GILMAN**  
*The Perfect Snubbing Device  
With The Steel Cable*



STEEL CABLE  
NEVER STRETCHES  
NEVER BREAKS

OUTSIDE ADJUSTMENT  
EASILY ACCESSIBLE

NEAT APPEARANCE  
COMPACT SIZE

SELF ALIGNING  
BALL CABLE END  
NEVER BREAKS  
NEVER COMES LOOSE

**Distributors Everywhere**  
**BURD HIGH COMPRESSION RING CO., Rockford, Ill.**  
"Makers of the famous Burd Piston Rings"

Second of a Series of  
SATURDAY EVENING POST  
Advertisements

## The Success of the Year!

No automotive product ever offered to the trade has won such instant success as the Burd-Gilman Shock Absorber. Its sales record is unequaled. Its record for performance has never been equaled. It has stood every test and you can safely recommend Burd-Gilman Shock Absorbers to your customers because every set is fully guaranteed to give efficient service.

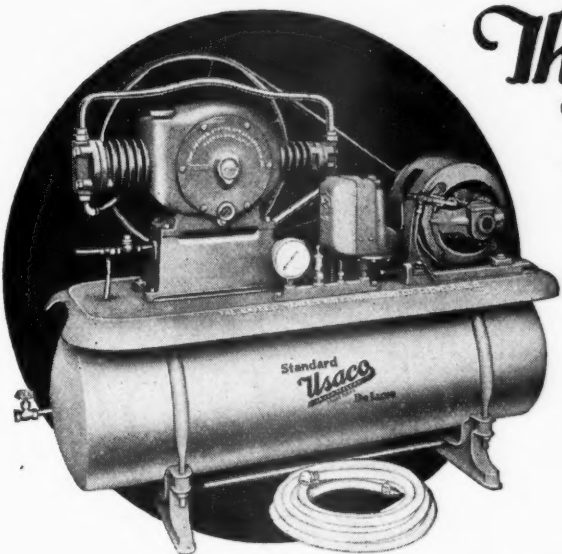
The Burd-Gilman offers motor car dealers especially an exceptional opportunity to increase their profits.

**Write for Circulars and Dealer's Discounts**

DISTRIBUTORS EVERYWHERE

**BURD HIGH COMPRESSION RING CO., Rockford, Illinois**  
"Makers of the Famous Burd Piston Rings."

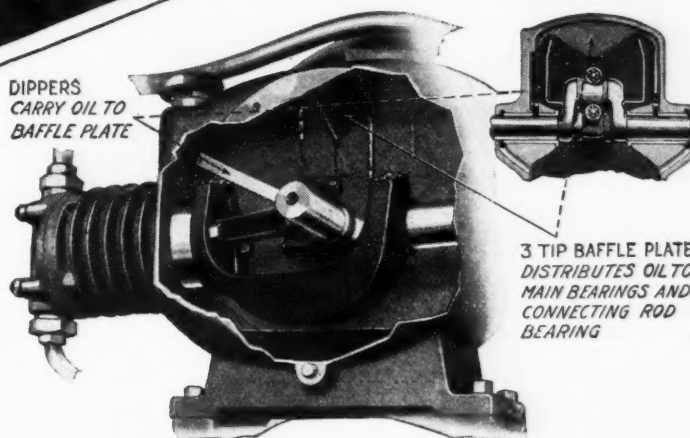




*The World's Leading  
Air Compressor  
with the  
Incomparable  
Pin Splash  
Oiling System*

**Usaco**  
U - say - ko  
AIR COMPRESSORS

Get literature describing this newest improvement, and the many other Usaco features before buying an air compressor. There is also in force a new low schedule of prices that will interest you.

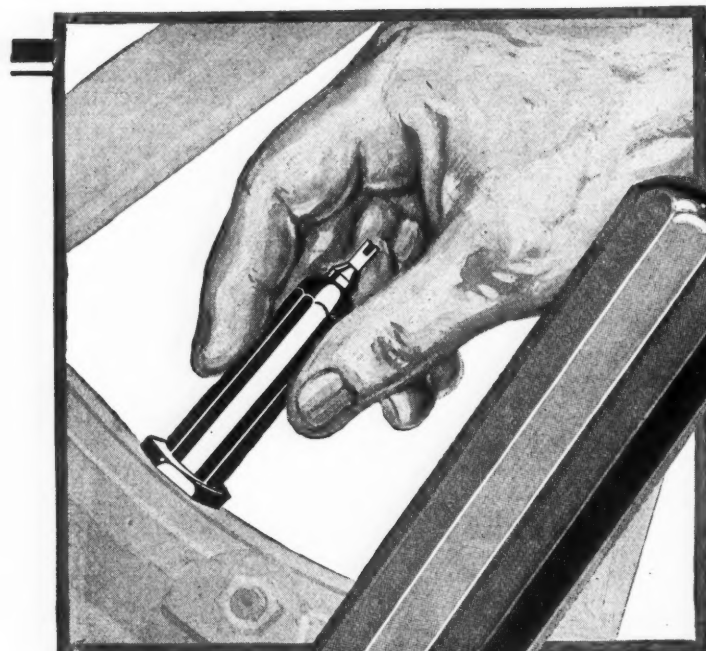


**The United States Air Compressor Co.**

5304 Harvard Ave.

Cleveland, O.

**Pioneers - the World's Largest Manufacturers  
of Two Stage Tire Inflating Air Compressors**



**DILL**  
**INSTANTON**  
Dust-and-Valve Cap

## Quickly On— Quickly Off and Quick Sales

**B**ALLOON TIRES—to give service—must *always* be correctly inflated. A loss of even five pounds pressure from a tire carrying but twenty-five or thirty pounds must be guarded against—or the tire suffers.

On balloon tires, as on regular tires, Dill Instant-ons *seal* the valve stem against leaks. The convenience of the Instant-on, combining dust cap and valve cap in one unit—on or off in 5 seconds—sells them on sight.

In recognition of the Instant-on advantages over a score of motor car manufacturers furnish them as standard equipment.

It is not surprising that dealers, the country over, are making quick, substantial profits handling Instant-ons. If you do not have a good supply, order at once from your jobber.

Sets of five, packed in individual boxes, retail at \$1.00 per set. Twelve of these sets packed in an attractive counter display, \$8.00.



Dill Standard Valve  
Insides

—Another quick seller. Looks different and IS different. Made with swivel top and protected, enclosed spring, reducing wear and preventing leaks.

Beautiful metal display stands, lithographed in colors, with 100 Dill Valve Insides packed in metal kits of five each—\$4.20. Retail at 30 cents per kit.



THE DILL MANUFACTURING CO., Cleveland, O.  
Also Manufacturers of Dill Standard Tire Valves and Dill Valve Insides  
Manufactured in Canada by The Dill Manufacturing Co., of Canada Ltd., Toronto

# DILL

## Tire Valves and Valve Parts



# NIGHT DRIVING DANGERS

Any one who drives a car is alive to the dangers of night driving, especially that which exists in the treacherous headlight glare of oncoming cars.

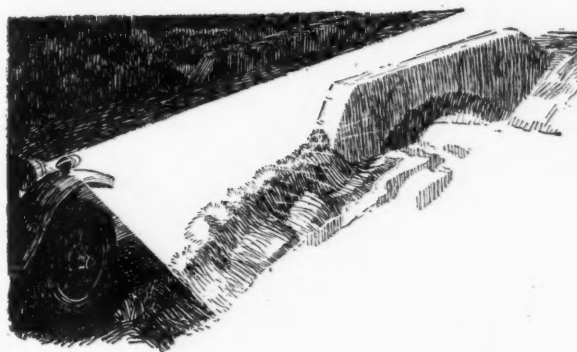
Then there are the ditches, sudden curves, culverts—obstructions of all kinds that make night driving perilous unless the road is lighted up clear, at least 60 or 70 feet ahead.

Jacobs Road Lite, built expressly to overcome night driving dangers offers the dealer a sure source of profit because this little sentinel is not only extremely efficient, but is smart appearing and priced to meet popular demand.

Dealers throughout the trade are having great success with Jacobs Road Lite. It looks well—it works well—it sells well.

Secure it now from your jobber or write direct.

**Jacobs Auto Safety Lamp Co.**  
Blacksburg, Va.



*Jacobs Road Lite is mounted on right front fender. Its shield confines its rays to right side of road and prevents it from shining in the other fellow's eyes. It comes complete with wire, switch, screws, 21 candlepower bulb all ready for use and very easy to install.*



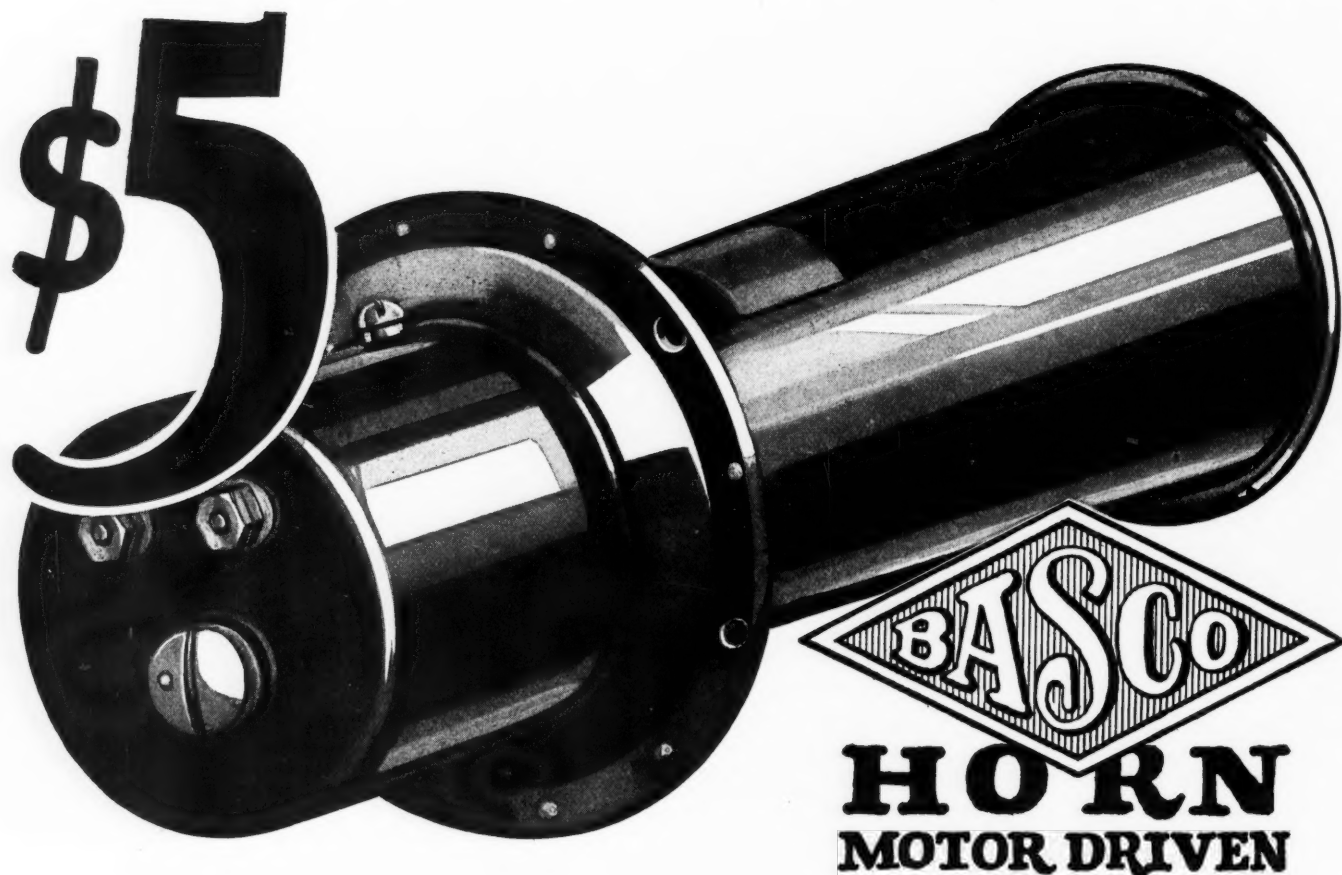
**\$4<sup>00</sup>**

*Actual  
Size*

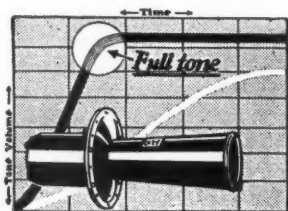
*As a Backing Lamp*

For a backing lamp, simply attach Road Lite to left rear fender. The lighting connections either for front or rear lamp—are independent of car's lighting system. Road Lite is switched on or off from dash at will of driver.

**Jacobs Road Lite**  
*Lights the way to safety*



## Big-Car-Built Light-Car-Priced!



The new Model B BASCO Horn reaches its full tone instantly—no sluggish response when action is demanded.

A deep-toned, mellow warning signal, fit companion for the finest cars, yet priced for the light-car owner who wants a horn that **commands** its right-of-way!

Tone adjustment and oiling of the new BASCO model B Horn are matters of a few seconds—all from the outside. Cover slipped off allows easy, quick brush adjustment. Loosening two screws permits entire disassembly.

Guaranteed, like all BASCO products, protecting you and the owner. Good looking, quick selling, profitable.

*Write for details of the BASCO sales and service proposition and name of nearest distributor.*



# Briggs & Stratton Co.

Milwaukee, Wisconsin



# A NEW TAILOR-MADE FAN BELT

for  
**CHEVROLET**  
 and  
 other popular cars



## *Gilmer* Super-Service Moulded "V" Belts

Fair List Price	Made to Fit
Good Trade Profit	Flexible
Real Good-Will Builder	Sturdy and Durable
Conveniently Packed	Maximum Service
Permanently Identified	Minimum Attention

The first stocks of Gilmer Super-Service Moulded "V" Belts were shipped about two months ago. Already, nearly every jobber has re-ordered, **Dealers' Stocks are moving and profits are being made.**

On request, we will be glad to furnish full information.

### **Gilmer** Radiator Connections

#### **Complete with Clamp Bands**

Gilmer Radiator Connections are ready for instant installation just as they come. They can be applied in an instant and are held firmly in place by strong rubber clamp bands. (No metal clamps required.) There are Gilmer Connections made to fit all popular cars and trucks. They are packed ten to the carton.



**L. H. GILMER CO.**

Tacony, Philadelphia



## The Silent Partner

To thousands of progressive automotive merchants MOTOR AGE is a source of sound advice and helpful suggestions. To these men it holds much the same position as a silent partner. It gives wise and varied counsel. It cites the experiences of other men. It warns of "get-rich-quick" methods, yet advises sweeping away the cobwebs.

In short, MOTOR AGE brings to an army of readers the kind of information that only a leading business paper can gather together. The sincere, unbiased manner of presenting this information has won for this paper a healthy, whole-hearted respect from men who are shaping the destiny of the automotive trade.

Those who read MOTOR AGE are progressive, thinking men. Those who advertise in it are in good company.

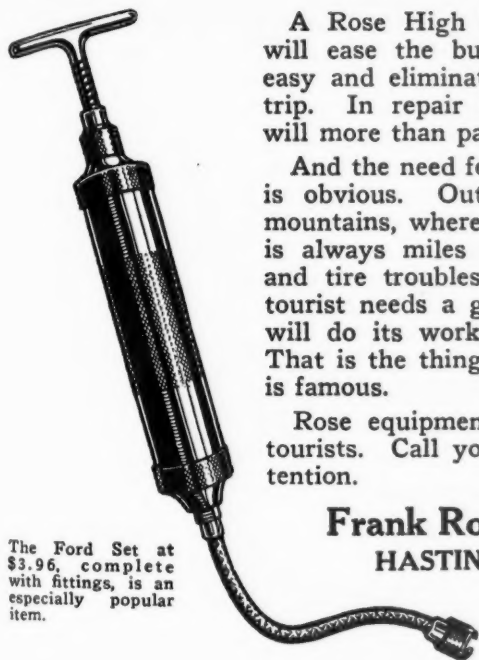
# MOTOR AGE

5 So. Wabash Ave., Chicago, Ill.





## 2 Things Every Tourist Should Take Along



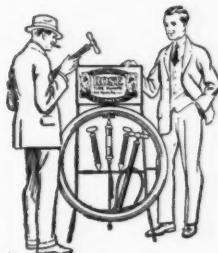
The Ford Set at \$3.96, complete with fittings, is an especially popular item.

A Rose High Pressure Lubricator will ease the bumps, make steering easy and eliminate wear on the long trip. In repair bills saved alone it will more than pay its way.

And the need for a Rose Tire Pump is obvious. Out in the parks and mountains, where tourists go, free air is always miles away when needed, and tire troubles are plentiful. The tourist needs a good pump, one that will do its work quickly and easily. That is the thing for which the Rose is famous.

Rose equipment is a favorite with tourists. Call your stock to their attention.

**Frank Rose Mfg. Co.**  
HASTINGS, NEBR.

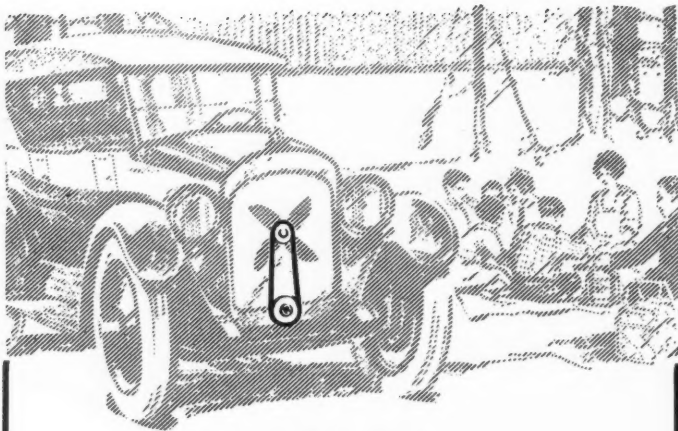


*Get This Free Merchandiser*

Stimulate Rose sales with this new Free Merchandiser. Puts the goods out where folks will see it, inspect it and ask questions — that is the first step in many an extra sale. Ask your jobber to send you one.

# ROSE TIRE PUMP

and HIGH PRESSURE LUBRICATING SYSTEM



**Rie Nie**

## The Universal Fan Belt!

Tourists everywhere are planning their trips for the coming season. Are you ready to supply the demand that is going to arise when the tourist starts buying his automotive equipment? Sturdy, strong and true, Rie Nie Fan Belts have built up an enviable reputation as a sure repeater, through years of rugged service.

Rie Nie Fan Belts are made in two types, Vee Round for grooved pulleys and Flat Type for Regular or crowned pulleys. Constructed of ply upon ply of specially prepared rubberized fabric of highest tensile strength.

Lay in a stock of Rie Nie Fan Belts now and get your share of these profits. The fact that fewer sizes are required to make up a complete stock has made them a favorite with dealers, who realize the advantage of a quicker turnover on a smaller investment.

*There is a Rie Nie Fan Belt for every make of passenger car, truck, tractor and circulating water pump.*

**Rie Nie**  
Trade Name

**FAN BELTS**

**DURKEE-ATWOOD CO.**  
 MINNEAPOLIS, U.S.A.

**DUESENBERG MOTOR FOR SALE**  
 Straight Eight Duesenberg motor complete in good condition. Fine motor for track racing. Price \$350.00.  
**CHAS. P. HANLEY**  
 Muscatine, Iowa

*This one-inch Advertisement appeared in Motor Age, January 31st. Cost \$7.25. "The motor was sold the next day."*

## "Deluged with telegrams!"

— writes Mr. Hanley, whose Broadcaster advertisement is shown above.

"Ever since the magazine came out with my ad our office has been deluged with telegrams. The motor was sold the next day, due entirely to the ad, and could have been sold half a dozen times after that."

\* \* \* \* \*

Broadcaster Advertising does bring results. Use the Broadcaster to dispose of your surplus equipment—to hire a reliable employee or find a better job—to get work for idle equipment—to buy machinery you need or to dispose of machinery you no longer need. Undisplayed advertisements, 6c a word.

BROADCASTER DEPARTMENT

**THE CLASS JOURNAL COMPANY**

Motor World, Motor Age, Automotive Industries  
 Distribution & Warehousing, El Automovil  
 Americano



## No. 740 Headlamp



**Exceptionally Attractive  
on the new Ford Cars**

**L**AMPS are the focal point of attention on any car, and the owner of a Ford car will appreciate at a glance the refinement available in a set of Victor Drum Type Headlamps. The little money it takes to do this will be an investment rather than a cost.

The appeal is strong—the lamp is of sparkling quality—it is sound in construction and built for efficient and lasting service.

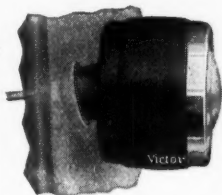
Victor Drum Type Headlamps are made in larger sizes for all other cars and are easily installed with our special "U" Universal Bracket. At slight additional cost the Victor Projector is supplied instead of prismatic lens.

Stock these lamps and make an additional profit on overhaul jobs. Use them to give new cars a distinctive appearance.



They set off the drum headlamps

The 345 and 346 Side Lamps are counterparts of 740 Headlamps in design. They differ only in the location of the ball and socket universal mounting which adapts either one or the other to any style of cowl.



No. 346

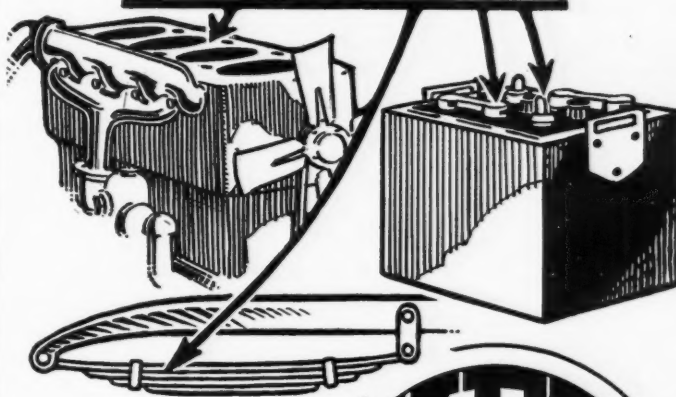


No. 345

An opportunity to sell a pair of these lamps is invariably a chance to sell a set. Stock them both for profit.

**The Cincinnati Victor Company**  
714 Reading Road Cincinnati, Ohio

# Put It There



*for  
Best  
Results*



**On Cylinder Heads**—It will seal gaskets permanently, prevent oil seepage and loss of compression.

**On Battery Terminals**—When Key Paste is applied it offsets and checks the action of sulphate corrosion which starts from this point and spreads to the cables causing shorts and weakening the entire battery if neglected.

**Between Spring Leaves**—It permits the leaves to slide over each other with a natural friction eliminating the whip action so prevalent when spring leaves are lubricated with oil. Besides these it is adapted to many other uses about the machine, and you need only remember one name—Key Graphite Paste.

Get the **FREE** sample and see how nicely it handles. It does not "stick" parts but really makes them easier to disassemble.

## KEY BOILER EQUIPMENT CO.

27th AND McCASLAND AVE.  
EAST ST. LOUIS, ILL.

**CLIP—**

Key Boiler Equipment Co.,  
27th and McCasland Ave., East St. Louis, Ill.

Please send me without charge or obligation a sample of  
Key Graphite Paste.

Name \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

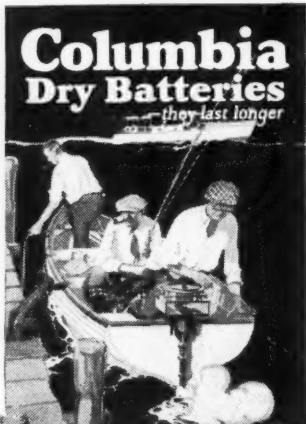
M. A.

**Sample  
FREE**

### Chained lightning with a sure kick

for

- motor boat ignition
- gas engine ignition
- tractor ignition
- starting Fords
- firing blasts
- doorbells
- buzzers
- ringing burglar alarms
- protecting bank vaults
- calling Pullman porters
- running toys
- telephone and telegraph
- lighting tents and outbuildings
- heat regulators
- electric clocks
- radio "A"



FIRE on the first spin and scoot away putt-putt-putt, with never a skip or miss. Columbias are sure-fire ignition.

To be real snapping, use the Columbia Hot Shoe. Four or more long-lived Columbia cells in a water-proof steel case. Neat as a new skipper. Water-proof as a duck. Convenient to carry and a cinch to connect. It gives your engine greater power.

After a Columbia has delivered fiery sparks all day it picks up new vigor overnight for next day's hand running.

Columbia Dry Batteries are sold by electrical, hardware and auto accessory shops, marine supply dealers, implement dealers, garages, general stores. Insist upon Columbias—Fahnestock Spring Clip Binding Posts on Columbia Ignitor at no extra cost.

NATIONAL CARBON COMPANY, INC.  
New York — San Francisco — Toronto, Ontario  
CANADIAN NATIONAL CARBON CO. LIMITED

## Columbias Are Sales Speeders

LIKE the batteries themselves, Columbia Dry Battery advertising is canned lightnin' on the go. Things move fast in these advertisements. They jump right into the reader's mind. They sell not only batteries, but the results that spring from Columbia Dry Batteries.

In this advertising, appearing in the leading fiction, class and technical publications, you all but hear the snappy command of bell or buzzer, the putt-putt-putt of motor boat engines, the boom of blasting.

That is one of the many big reasons why Columbia Dry Batteries are proving the quickest selling, best known batteries of all. There's speed in Columbia Dry Battery advertising, speed in the apparatus to which these fine batteries are hitched, speed in sales for the dealer who stocks — displays — pushes — sells — Columbia Dry Batteries. Ask your jobber.

Manufactured and guaranteed by

National Carbon Co., Inc.  
New York—San Francisco

Canadian National Carbon Company, Limited, Toronto, Ontario



## It Sells Itself

Hundreds of dealers are making May 1924 the biggest month in retail tube patch sales in their history.

These new snappy window displays printed in red, white and blue do the work.

On your counter or in your window every minute of the day they put the story across. They make sales without much of your personal attention except to hand out the package and ring cash into the till.

Why not write your jobber today and stock the patch that is well advertised, well displayed, has public confidence and sells itself.

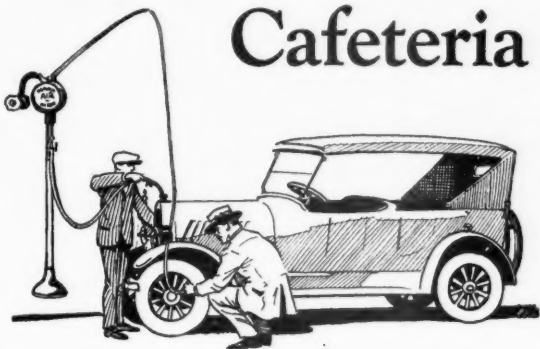
LAS-STIK PATCH MFG. CO.

Hamilton, Ohio

**Las-Stik**  
TUBE PATCH



## Air & Water Cafeteria



**Y**OU can make free air and water service pay for itself with a Franklin Air and Water Station, the clean, quick, convenient dependable outfit. It does two things:

**FIRST**—it cuts down your overhead by saving the time of your mechanics and helpers who now have to wait on your customers when they want air and water. A Franklin is an "Air and Water Cafeteria"—folks help themselves, and they're glad to do it.

**SECOND**—it attracts the attention of passing motorists. They stop at your place for air and water, and they remember your place. Eventually they're more than air and water customers; they begin buying the things you sell.

The Franklin outfit stands 12 feet 6 inches overall, having a glass-encased head that's wired for lighting. The head revolves, and with the extra long air hose makes it possible to serve two cars standing at the curb. The water flow is controlled by a non-corrosive brass valve. Clean, quick, convenient!

The Franklin comes in grey and black, the curb model selling for \$58.50, f.o.b. Norristown. If you can't use a curb model, we make wall bracket models at \$43 with air and water connections, and \$38.50 with air connection only. Order today from your Jobber, or write us for full particulars of this paying outfit.



Super Single Stage  
Air Compressor

Exclusive Franklin  
design, \$225 f. o. b.  
Norristown. Write  
for folder.

# Franklin

## Air Compressor Works

2604 Main Street  
Norristown Pennsylvania



This Weston Model 280 Testing Set will locate it quickly and with the least amount of trouble. No guesswork. It accurately detects.

Short Circuits  
Grounds  
Brush Troubles  
Starting Current  
Polarity

Leakage Current  
Defective Commutators  
Open Circuits  
Run Down Batteries  
Defective Lamp Sockets

Put all your testing on a quick, accurate and efficient basis with the Weston Model 280 set. Really a miniature precision volt-ammeter having six ranges 30 and 3 volts—100 milli-volts—and 300. 30 and 3 amperes. Uniform legible scale. It is perfectly damped, responsive and shielded from disturbing influences of external magnetic fields. Built by America's pioneer instrument maker.

## Weston Complete Test Equipment

No. 441. "Fault Finder" for utility use and general testing.

No. 443. Battery Voltmeter for testing individual cells of battery.

No. 453. Battery Tester for heavy discharge battery testing.

With Weston instruments the results of your test cannot be successfully disputed.

Complete information on request. Send for Booklet "H". It illustrates, describes and gives prices of Weston instruments and accessories for automotive service.

**Weston Electrical Instrument Co.**  
9 Weston Avenue Newark, N. J.

Branch Offices in All Principal Cities

# WESTON

Electrical Indicating Instrument Authorities Since 1888  
STANDARD—The World Over

## New Profits for Battery Dealers

To tell a car owner that the battery you sell him is practically neglect-proof; that it will stand-up for years without apparent deterioration—THEN—to have our **THREE YEAR ADJUSTMENT GUARANTEE** backing you up, and you make your own adjustments—there's an ideal battery business for you.

### COMET

#### SEMI-DRY STORAGE BATTERY

is guaranteed to give service for three years—in any car—at a cost of only 2c per day. Figure it up. Ideal for Radio, too.

*Many thousands giving utmost service. Send for the wonderful story of THE COMET.*

### Butler Battery Co., Inc.

*Manufacturers of Comet Batteries.*

Factories, Butler, Ky., and Chicago, Ill.  
General Offices: 10 N. Clark St., Chicago, Ill.



#### Branches

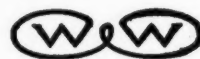
Eastern Comet Sales Co., Graham, Virginia

Comet Storage Battery Co.,  
Entire Block of Fifth Ave., 136th to 137th St.  
New York City

Comet Sales Co.  
626 Riverside Ave.  
Jacksonville, Fla.

Schultz Sales Co.  
220 S. Grand Ave.,  
Lansing, Mich.

Comet Battery Station  
Fort Smith, Arkansas



## "IDEAL"

Assortment of

## COTTER PINS

The standard assortment of Cotter Pins for general auto requirements—packed in a practical size, round screw-top box, attractively and fully labeled. Containing 100 assorted Cotters ranging from 1/16x1/2" to 5/32"x1 1/2"—being all the essential auto sizes. Just the thing for the shop or Counter Sales.

We also make the well known W. W. Assortment in Leatherette covered cases as well as assortments for Agricultural Implements and Hardware requirements. We manufacture all sizes of Cotter Pins.

*Ask your jobber for the W. W. line*

**WESTERN WIRE PRODUCTS COMPANY**  
St. Louis, Mo.

## WOULDN'T A CANTON CRANE HELP YOU?

Those lifting jobs that call the men away from their work can all be handled by one man with a Canton Crane—quickly and efficiently.

The Canton is designed for shop use. It fits into the tight places and lifts heavy loads easily. Wouldn't a Canton Crane help you to more profits, increased shop efficiency and greater volume?



Write for this free booklet now

It illustrates how practical and well designed the Canton Crane is. Various models are shown. May we send you a copy? Just a line asking for booklet MA will bring it promptly.

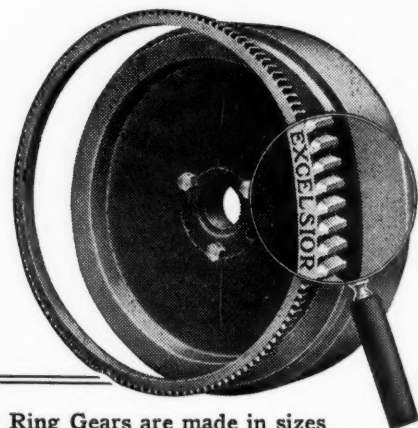
**The Canton Foundry & Machine Co.**  
Canton, Ohio

*New York Office, 203 East 15th Street*

# CANTON

PORTABLE  
CRANE & HOIST

## Made in Sizes to Fit Any American Car or Truck



Excelsior Steel Ring Gears are made in sizes to fit the flywheel of any American car or truck. They are cut to the correct chamfer and pitch to insure quiet and perfect engagement with the starter pinion.

The installation is simple. Machine the old teeth off the flywheel—heat the Excelsior Ring Gear and shrink it in place. You make a double profit and please your customer by saving him time and the cost of a new flywheel.

Excelsior Steel Ring Gears are made of S. A. E. 1035 steel, specially heat treated and weld tested under hydraulic pressure. Order through your jobber. If he cannot supply you, write to us.

**The Springfield Mfg. Co.**

221 West Main St.

Springfield

Ohio

## EXCELSIOR STEEL RING GEARS





**This better belt**  
*makes you more money*



**G**RATON & KNIGHT Link "V" Fan Belts increase your profits because they sell easier and quicker. Definite superiority speedily convinces your customer this *master belt* is the one he must have!

Links of tempered steel and vulcanized fibre give giant strength. They absolutely prevent stretching. Around them is a heavy, clinging traction surface of Graton & Knight *standardized leather*!

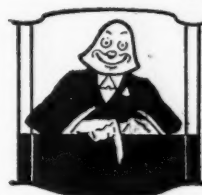
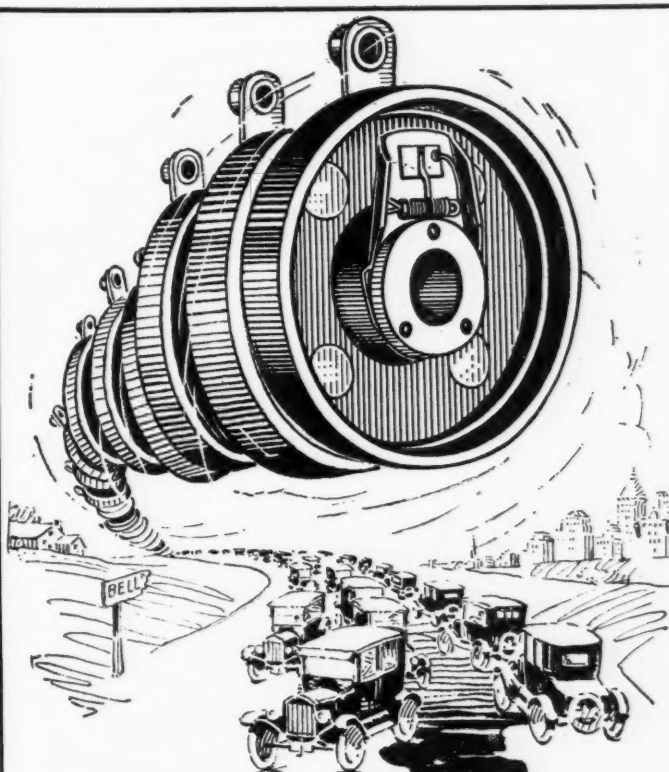
This *standardized leather* gives the belt its mighty grip. It hugs the pulleys and pulls evenly. So it can be run slightly slack, which saves bearings. More flexible than any other fan belt. Therefore runs well on very small diameter pulleys. *Can be made endless with a screw-driver.*

The margin in Graton & Knight Link "V" Fan Belts is very interesting. And the long-term, trouble-free service they give your customers wins you price-less good-will. Write your jobber to-day for prices and particulars.

THE GRATON & KNIGHT MFG. CO.  
*Worcester, Mass.*



**GRATON & KNIGHT**  
Standardized  
**LEATHER BELTING**



*Going Like a Whirlwind*

Jobbers and dealers tell us that the BELL is becoming their fastest-selling Ford timer—because every user is a salesman.

## The BELL TIMER

*"Built like a high-grade distributor"*

is made to create satisfaction. It cannot rust, warp, or get "lumpy," and needs no oiling or attention. Copper contacts molded into solid Bakelite shell; copper brush; perfect wipe contact.

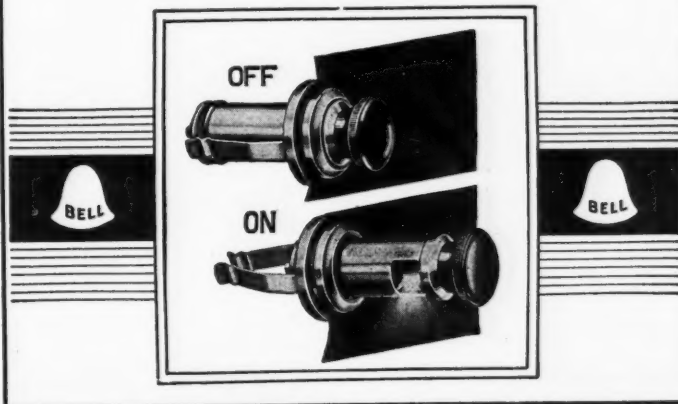
*If you don't stock Bell Timers write us today.*

**Bell Manufacturing Co.**  
13 Elkins St. Boston 27, Mass.

*Another winner in the sales race is the ingenious*

### BELL DASH LAMP

*For Fords and other cars  
Sells on sight*





**60,000 Sold in six months**

**MINUTE METER \$2.50**

The Lux Clock Mfg. Co., Waterbury, Conn., U.S.A.

**The Cash Register is the Alarm and it r-r-rings very often!**

Sales on this low-priced, dependable automobile clock keep the cash-register ringing—Proof? 60,000 Minute Meters Sold in six months, the first six months of its existence!

And the Minute-Meter Stays Sold—its ability to tick the minutes off "to the minute" day in and day out is the reason. Convenient, too, a turn of the knob, shown in illustration and the Minute Meter lifts out for rewinding or setting. A handsome reliable little instrument with a display stand that shows it off to advantage.

The Minute Meter fits flush on any dash of any thickness, wood or steel. Neatly packed in individual cartons. Attractive display stand as shown above with each dozen! Orders shipped promptly!

**The LUX CLOCK MANUFACTURING CO., INC.**  
Waterbury - Connecticut - U.S.A.



**Minute Meter Dash Cutter**

**Added Profit in Installation**

Add 50 cents to the price for installation! With the Dash Cutter the Minute Meter can be put on a wood back instrument board in about 15 minutes—10 minutes for all-steel boards! Complete, ready for use, \$1.00. Two installations and the cutter is paid for.

## Get a Manley



**Portable Floor Crane**


The Manley Portable Floor Crane possesses all the essentials of a crane for the best and most economical automobile repair work. It has high lift, deep overhang, ample lifting capacity and great strength.

And, at the same time, due to revolutionary design, the Manley Crane has the greatest lightness in weight.

Write for the complete catalog of Manley Equipment

**THE MANLEY MANUFACTURING CO.**  
YORK, PA.

**"OH HIM?—HE'S THE OLD MAN'S NEPHEW!" NEPOTISM**



**"Triple-Tested, Never-Bested"**

It is an inflexible rule of the makers of Anchor Auto Bulbs, applicable from the president down, to employ only one member of any family.

Thus we eliminate favoritism being shown to one's incompetent relations at the expense of jobbers, dealers and car owners.

We rid the plant of inefficient workers by sticking to this rule against nepotism.

Our rigid system of counter-checking 21 operations, unhampered by sentimental complications, assures you a lamp scientifically perfect and reasonable in price.

**ANCHOR AUTO BULBS**  
"Triple-Tested, Never-Bested"

Anchor Electric Co. 555 Jackson Blvd., Chicago, Illinois  
Originators of "Same Day Service" in the Auto Bulb Industry

## Jack—For Balloon Tires



The Springfield Jack No. 9 especially designed for balloon tires—

Double Screw—Ball Bearing Low Placement—High Lift Height when closed, 7 inches Extends to 17 inches.

Convenient handle excellent workmanship and quality.

Dealers—Jobbers—Write us for discounts

**THE SHAWVER CO.**  
Springfield, Ohio

Weight 8 pounds  
Capacity 1 ton  
Price \$4.75

See the

## Broadcaster Department

Page 105

## SIMPLEX replaces the regular Ford Transmission

**For More POWER**

26 to 1 in low in our new type "CT"



**"It will pull like everything"**


Three Speed Sliding Gear Type—for Ford Cars and Trucks

You have three speeds forward and one reverse, replacing the regular Ford transmission—drums, bands and all. The low speed is lower than the Ford, therefore, more power—the third is the same as the Ford and the second is half way between.

It's ruggedly built with over-size alloy steel gears. Multiple disc clutch. Foot break on jackshaft outside of case. Hyatt Roller and Genelite bearings. No cutting or machining—installation easy.

**E. D. & A. F. CRONK, Inc., 140 Hotel St., Utica, N. Y.**

You get quality work, SAE specification materials, and the right price if you send your connecting rods to a Watkins plant for rebuilding and refuse imitations of



## WATKINS Complete REBABBITTING SERVICE

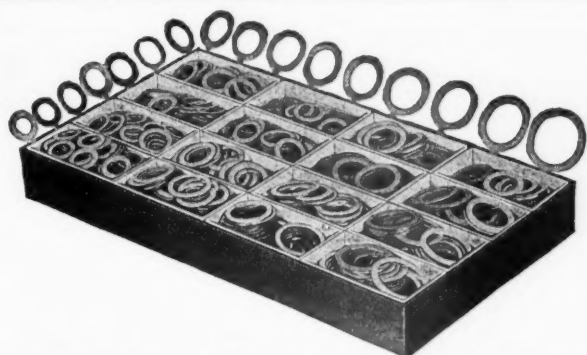
"One Day Service from factory nearest you"

Hartford, Conn., Ripley Motor Service  
Indianapolis, Ind., Indiana Watkins Mfg. Co.  
Kingston, Ont., Watkins Mfg. Co., of Canada, Ltd.  
Los Angeles, Calif., Wright Mfg. Co.  
Memphis, Tenn., J. B. Cook Auto Machine Co.  
New York, N. Y., Lake Sales Company  
Omaha, Nebr., Interstate Machinery & Supply Co.  
Portland, Ore., Factory Motor Car Co.  
St. Louis, Mo., H. & H. Machine Co.  
Seattle, Wash., Solon Grinding Co.  
Syracuse, N. Y., Watkins Mfg. Co. of New York  
Toledo, Ohio, Stewart-Burgan Co.  
Washington, D. C., R-L Motive Parts, Inc.  
Waterloo, Ia., All States Rebabbitting Service  
Wichita, Kans., Home Office, The Watkins Mfg. Co.

New bolts and nuts, laminated shims, new piston pin bushing are part of the rod rebuilding at no extra charge.

New Bearing tinned in the rod and broached to mirror finish fits quickly to crankshaft and cuts time on flat rate repair jobs. Practice sending your rods in regularly. There's profit in it.





## 850 Steel Spacing Washers

17 sizes—50 of each size per box. Inside diameters from  $\frac{3}{8}$  to 1 inch, .015 thick. This assortment made for adjusting end play in all makes and types of starting motors and generators. Largest washer illustrated made to go in the front end plate of Ford generator. Lateral motion thus adjusted without removing bearing from armature shaft.

Mailed, post paid, per box, \$3.50.

*If not handled by your jobber, order from us.*

*Any size or sizes used, can be replaced.*

**ARMATURES:** We rewind any and all kinds of GENERATOR, MOTOR and MAGNETO armatures, and reship same day old armatures received.

FORD GENERATOR AND MOTOR ARMATURES ..... \$1.50

ALL SMALL DOUBLE UNIT GENERATOR AND MOTOR ARMATURES ..... 5.00

SINGLE UNIT MOTOR GENERATOR ARMATURES ..... 10.00

MAGNETO ARMATURES ..... \$3.75 to \$4.75

**Armature Rewinding Co., Inc.**

3301 Washington Blvd., St. Louis, Mo.

## Good Sellers at THE PUMP

Tasco Gas Gauges, because they save so much trouble for Ford and Chevrolet owners, sell easily at the pump.

Dealers selling the Tasco Gauge replace the old cap with a Tasco

after filling the owner's tank. A minute to point out the trouble it saves and nine times out ten a sale is made.

Write today for the liberal discounts on these quick money-makers or ask your jobber. When writing, please mention your jobber's name.

THE AKRON-SELLE CO.  
Akron, Ohio

"40 Years in Business"



RETAILS

AT

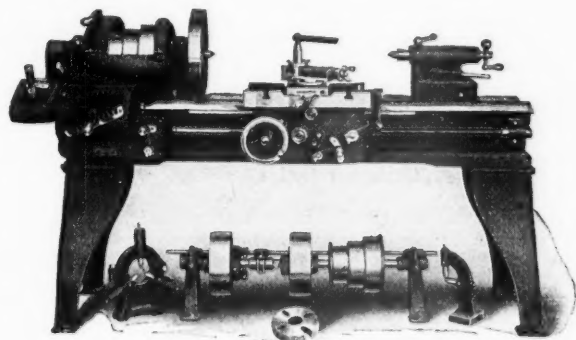
**\$1.25**

**TASCO GAS GAUGES**

FORD and CHEVROLET

## C-J Profit Producing Lathes

Are Pioneers in their field, being the first modern Lathes to be adopted generally in auto service stations. A standard make, one of the oldest in the field, backed by many years successful service. Known and in use the world over.



13 inch; 15 inch; and 16 inch swing Quick Change Gear or Semi Quick Change Gear. ACCURATE; DURABLE; SIMPLE TO OPERATE.

Every worthwhile feature but not one superfluous feature is embodied in these quality Lathes.

HONESTLY BUILT

HONESTLY PRICED

Write today for Special Garage Bulletin "M.A."

**The Carroll-Jamieson Machine Tool Company**

Batavia, Ohio.

## A Sledgehammer BLOW to PISTONS BEARINGS CRANKSHAFT THE WHOLE CAR

Any car has a hard enough road to travel when running properly. A spark plug that fails to fire not only lessens the power of the motor, but it's like a sledgehammer blow to the pistons, bearings, crankshaft and the whole mechanism.

Usually, it's the fault of the insulation. And that fault is easily remedied by the use of spark plugs with "775" insulators. "775" stands the gaff under the worst conditions. Maybe, that's why most of the better spark plug makers use it as regular equipment.

**"775"**

**Frenchtown Porcelain Co.**

Trenton, New Jersey

"Established 1910—  
Busy ever since"

**STANDS THE TEST**

## Goodrich Cable

AUTOMOTIVE EQUIPMENT  
*Starting-Lighting-Ignition*  
Formerly M.R.

Goodrich Cable is sold in lengths found to be the most popular with the average buyer—coils of 100 ft. packed in individual cartons. Both shop men and car owners like the clean 100 ft. package idea—and this leads to quick and profitable sales. Send for samples, prices and discounts.

THE GOODRICH-LENHART MFG. CO., Hamburg, Pa.

## EVERYDAY

PISTON RINGS

Interlocking joint eliminates all filing, fitting and joint leakage.

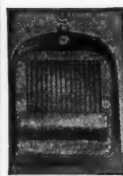
*Priced to be profitable to dealer and jobber.*

ROYAL PISTON RING CO., INC., BATH, N. Y.

## EVER STEP

PISTON RINGS

A high grade step cut at a low price; lathe turned individually gauged.



## TYSON

### Radiator Cover

Fits Core only. Best weather-proof materials. Ford size \$3. Average all other cars, \$4. Write for discounts.

TYSON MFG. CO., Lock Haven, Pa.

### Stay-Tite Tire Cover

With handy hook. Hooks easily. Can't loosen. Top material or enamel drill. As shown and Drug Type.



## ALMOND "STRAIGHT LINE" DRILL CHUCKS

When buying Portable Electric Drills be sure to look for the distinctive ALMOND CHUCK, which may be easily identified by the "STRAIGHT LINE" milling on the chuck body.

Write for complete information regarding the new ALMOND "STRAIGHT LINE" CHUCKS.

T. R. Almond Mfg. Co., Ashburnham, Mass., U. S. A.

## Meachem Gear Rings for Fly Wheels

Quality rings at lowest prices. Get our list.

MEACHEM GEAR CORPORATION  
Syracuse, N. Y.

## TESTBESTOS Automobile Brake Lining

Manufactured by  
AMERICAN ASBESTOS COMPANY  
Norristown, Pa., U. S. A.



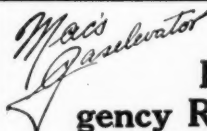
## IT'S EASY TO SELL

"The only oil ring with a mileage guarantee"

"Sav-Oil" is stamped on bottom of every ring

The Sav-Oil Ring Mfg. Co.

1037 S. Figueroa St., Los Angeles



## A Vacuum Gas Feed and Emergency Reserve Combined.

For Ford Cars and Trucks  
Mountain Accessory Co.  
Emporium, Penna.

\$7.50

## Kawneer

SOLID COPPER  
STORE FRONTS

Write for Special Book Garage Fronts

THE KAWNEER CO., 1219 Front St., Niles, Mich.

## KISSEL

The Custom Built Car



The Aristocrats of Motordom

7 Models—Open and Closed

Distributors in principal cities. Open territory now being closed.

Kissel Motor Car Co.  
Hartford, Wis.



DOUBLE YOUR FORD SELLING FIELD  
And Make Two Profits with

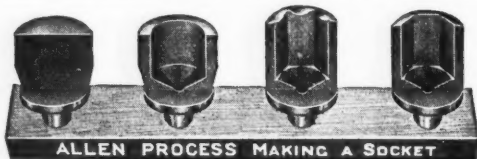
## Warford

AUXILIARY TRANSMISSION  
Two-Ton Capacity—High Speed

Ask your nearest distributor to demonstrate it or write us.

THE WARFORD CORP., 44 Whitehall Street, New York

Cold-Drawn Sockets



ALLEN Wrench Sets

ALLEN PROCESS MAKING A SOCKET

The Allen Manufacturing Company, Hartford, Conn.

## THE QUINCY SILENT AIR-MASTER

The Most Air Per Dollar Cost

WALL PUMP & COMPRESSOR CO.

Quincy, Ill., U. S. A.

## WEL-EVER

"OIL CONTROL" PISTON RINGS

The Motor Necessity That Has Made Good

Backed by Seven Years' Satisfactory Service

THE WEL-EVER PISTON RING CO., TOLEDO, OHIO

Sold most everywhere. If your dealer cannot supply you write us.

Styles for all Cars

## Gemco Bumpers

Write For  
FREE CATALOG  
No. 31



Made by World's Oldest  
Bumper Manufacturers

GEMCO MFG. CO.

742 So. Pierce St. Milwaukee, Wis.

## KING QUALITY

ALL THE NAME IMPLIES

STEERING KNUCKLE BOLTS AND BUSHINGS  
PISTON PINS—PISTON PIN SET SCREWS

*Automotive Division*

KING SEWING MACHINE CO., BUFFALO, N. Y.



## OVER 12 MILLION CARS AND TRUCKS REQUIRE SERVICE

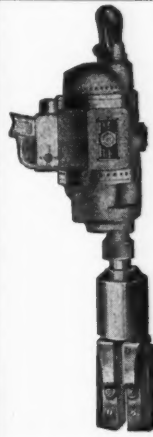
Good wrenches—the right wrenches—are essential to good service.

This is where the Walden-Worcester design comes in—wrenches that fit the location as well as the nut.

### WALDEN - WORCESTER

Incorporated

General Offices and Factory  
475 Shrewsbury Street  
Worcester, Mass., U. S. A.



### USE A STORM HONE

It handles an important part of your cylinder work. Takes all sizes of cylinders from 2 3/4 to 8". The deep, heavy, wide faced stones on the Storm Hone mean longer life, faster cutting and smoother finishing as well as freedom from chatter and stone breakage. Complete and with extra equipment only \$40.25.

Write for the Storm Book, "Modern Cylinder Methods"

## STORM Mfg. Co.

406 A Sixth Ave. So.  
Minneapolis



## Get This "Pioneer" \$65 Garage Special

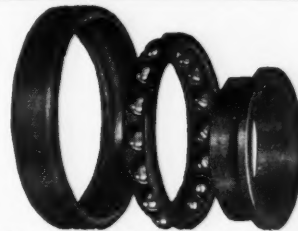
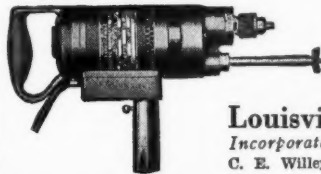
Electric Drill  
and Valve Grinder

Greatest time and money saver, as well as money maker, for your shop—

"It Will Do The Work"

Louisville Electric Mfg. Co.

Incorporated Louisville, Ky., U. S. A.  
C. E. Willey, Pres. J. B. McFerran, Secy.-Treas.



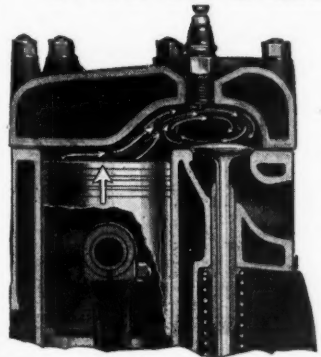
The Bearings Company of America  
Lancaster, Penna.

Angular Contact Radial Bearings—Angular Contact Thrust Bearings—Thrust Ball Bearings—"STAR" Ball Retainers for Thrust, Magneto, and Cup and Cone Bearings.

Your inquiries are solicited

Western Sales Office,  
1012 Ford Bldg., Detroit, Mich.

## The Ricardo Head



Turbulence Speeds Up  
Combustion

Slow burning mixtures are speeded up at all loads and at all speeds.

The performances and economies that the Ricardo Head makes possible promises much for the future of high speed, high compression E.I.I. Head engines.

WAUKESHA

Motor Company

ENGINE BUILDERS

Waukesha, Wisconsin

New York

Detroit

## There Simply Isn't Any Better Flux Made Than Rubyfluid!



A complete substitute for dangerous acids, Zinc Chloride, Salammoniac and other mixtures commonly used as a Flux. Ruby Fluid is quick acting, anti-rusting and is always ready for instant use. Ruby users include the foremost industries of the country.

Send for generous Free Sample

## Rubyfluid

TRADE MARK REG.

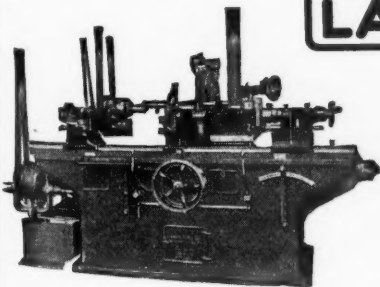
COMBINATION  
SOLDERING AND TINNING FLUX

THE RUBY CHEMICAL CO.

68-70 McDowell St.

Columbus, O.

## LANDIS



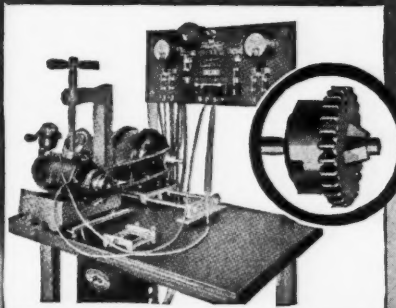
The LANDIS 4-A Special GARAGE Grinding Machine is built ESPECIALLY for repair shop work. You don't need a manufacturing machine—don't get one. The 4-A Special is perfect for repair shops. Quick and easy change from job to job. Simple to operate. ACCURATE. Built by world's largest makers of grinding machines. More value for your money. Catalog.

Landis Tool Co., Waynesboro, Pa.

New York Office—30 Church St.

## EXCELSIOR TEST BENCH

With the Positive Drive and Speed Control



INCREASE  
YOUR PROFITS!

Starting, lighting and ignition pays bigger profits than any other branch of automotive service.

The Excelsior  
Test Bench

equips your shop complete for this work.

Price \$385.00

Payable \$50 per month

Write for bulletin 975M

WEIDENHOFF 4330 ROOSEVELT ROAD  
CHICAGO, ILL., U. S. A.



### Automobile Selling Sense

225 Pages of Automobile Selling Ideas

The best book on automobile selling ever written. It covers every phase of motor car merchandising. Twenty interesting and practical chapters. Order your copy today. Take advantage of the assistance it will be to you.

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411 Kerr Bldg., Detroit, Mich.  
Send for our Catalog of Selling Equipment.

\$2.00  
Postage Paid

### \$17.50 COLONIAL CYLINDER HONES \$17.50 PRICES REDUCED ONE HALF

You can now buy the Colonial Cylinder Hone, an approved tool for this class of work and one of the best Hones on the market at \$17.50 each F. O. B. Kalamazoo. Made in three sizes, one, two and three, No. 1 2 3/4" to 3 1/4", No. 2 3 1/4" to 3 3/4" bore, No. 3 3 3/4" to 4 1/4". Colonial Cylinder Hones are now being used by some of the best factory Service Stations in the country as well as by numerous Service Station Owners.

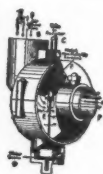
Colonial Gear & Manufacturing Co., Kalamazoo, Mich.



### Front-Wheel Brakes

supplied for ANY MAKE of car. Easily installed. Golden repair opportunity. Write for price list and BIG DISCOUNT.

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All the sales features of an air cleaner plus the advantages of a humidifier. Moistens air by washing it, providing

### Complete Combustion

Resulting in greater power and speed, less gasoline consumption and no carbonization.

Jobbers—Dealers—Write.

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Won't Leak Because They're Sealed With Oil

No-Leak-O Piston Rings are making money for dealers everywhere. Their "oilSEALing" groove—found only in No-Leak-O—packs an oil film in between piston and cylinder walls like "packing" in a pump. Oil and gas stay where they belong. National advertising is helping the dealer sell No-Leak-O.

It will pay you to stock No-Leak-O at once.

Price 35c and up

NO-LEAK-O PISTON RING CO., Dept. 376, Muskegon, Mich.

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Made in 17 sizes. Expansion, smallest size—15/32" to 17/32". Largest size—3 1/4" to 4 1/2". Reams bushings accurately to size and in absolute alignment. Special Ford Set complete \$20.50. Others at \$39.50 and \$48.80.

Write for descriptive circular.

ALVORD REAMER & TOOL CO., MILLERSBURG, PA.



More Power  
Less Fuel

Zenith - Detroit Corporation, Detroit, Mich.

### "CONNEAUT" Plastic Metallic Packing

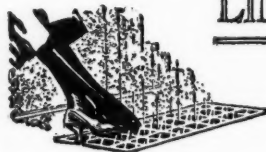
Patented

Stops the leaks in automobile water pumps. Mold it with your fingers. Makes a smooth metal bearing—adjustable and practically frictionless. At your Jobbers—Get it today. It does the trick. Put up in 1 lb. cans. If your Jobber doesn't carry it, write us direct. Price \$1.65 per pound, f. o. b. Conneaut, Ohio.

The Conneaut Packing Company

Conneaut, Ohio

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### LINENDOLL EXHAUST HEATER

Attractive in appearance, with cleaning features of removable heating coil with no connecting joints inside the heater pan to leak. Meets instant approval. No odor or noise. Easily installed and operated. Will boost your winter sales—get our attractive trade proposition.

THE NORWALK AUTO PARTS CO.  
Norwalk, Ohio



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Repairmen say it does finest work. Has no complicated parts, delivers power exactly over the center and can be controlled perfectly. Reaches valves ordinarily inaccessible. Liberal discount. Ask your jobber.

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### Start Making Big Profits CHARGING BATTERIES

\$20 Monthly Pays  
for Your Outfit

### H-B 8 HOUR CHARGING PAYS FOR ITSELF

Small cash payment puts HB 8-Hour Battery Charger in your shop. Your increased profits easily carry the small \$20 monthly terms, with good surplus besides. HB 8-Hour service builds trade, beats competition. An HB saves you \$35 to \$115 over any other outfit on purchase price alone.

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GASOLINE RESERVE FOR FORDS

Ask Your Jobber or Write Us.

REMINGTON AUTOMOTIVE CORPORATION  
17 West 60th St. New York, N. Y.

The Man  
Who Owns  
It Never  
Runs Out  
of Gas

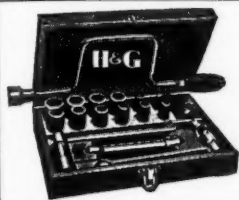
## Write ~ and find out how WATSON STABILATORS

Change the Whole Nature of Your Car  
JOHN WARREN WATSON CO., 24th & Locust Sts., PHILADELPHIA



Heat shaped to insure perfect roundness, sold at almost the price of a snap ring.  
Wilkening Mfg. Company  
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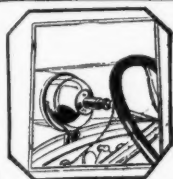




### 140 Combinations —all in this ONE set

Everything you need, in one small box, compact, accessible, and a real mechanic's outfit. Sockets will not break. Fully guaranteed. Ask your dealer or write us.

The Eastern Machine Screw Corp.  
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INSIDE THE WINDSHIELD—NO GLASS TO CUT  
INSHIELD 8 4 1/2 in. diameter. Heavy Nickel or Black Enamel. Made of heavy sheet brass. 21 c. p. Mazda precision type tipless bulb, silver, triple-plated reflector \$7.50  
INSHIELD SENIOR 5 1/2 in. diameter. Nickel finish only. Simplest and best inner-controlled driving light made. \$10.00

Patented Oct. 30, 1923

The Inshield Products Co., Toledo, Ohio  
Formerly the Thal & Butter Machine Co.

## RAMCO Cushion INNER RINGS

fit behind piston rings and keep them in perfect contact with the cylinder walls at any motor speed or temperature.

RAMSEY ACCESSORIES MFG. CORP., ST. LOUIS, MO.



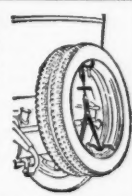
### \$700 Profit in One Month

That's what one distributor made. He's only one of many doing a big business. Dealers, too, are making sales by the dozens. Few accessories in recent years have been as popular as the

#### DUPLEX

Second Spare Tire Carrier & Rim Tool  
Carries spare tire—also expands and contracts rim when changing tires. Two tools for the price of one. Write for details.

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100% efficient. Requires no key for locking. Rigid as a stationary wheel.

Send at once for Sample Wheel. Examine it. Test it. Convince yourself of the easy profits to be made. It's a big seller in a big field.

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### DON'T

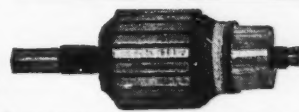
Turn Down a Rewind Job

Send it to us. We are "Armature Winding Specialists."

Profit for you in our service—Ford generator armature rewind—\$1.95. Other prices in proportion. All work guaranteed. Write for catalog and prices on all generators.

H. M. FREDERICKS CO.,

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"Guards Your Battery's Health"

Here at last is a battery tester of very finest quality. It is absolutely guaranteed to be accurate—every instrument must pass the two-point test. Green ribs of celluloid make sticking of float impossible. Write for details.  
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### The 100% Lubricants

Guaranteed not to cake or harden or to contain any Moisture, Mineral or Fatty Acids. Attractive proposition for Jobbers and Dealers.

RADIANT OIL CO., Inc.  
Manufacturers and Compounders

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High in Quality—Low in Price

Get Our Plan

Steinberg Products Co.  
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## Good Profits for Distributors in Brunner Gauges for Fords!

More Distributors needed NOW to sell Brunner Gas and Oil Gauges for FORDS, and Oil Gauges for Chevrolets. These new gauges operate on gravity pressure. Gas Gauge is graduated steel measuring rod in nickel plated tube. Oil Gauge is Japanese tube with graduated measuring rod. Raise hood to read. Retail at \$3.30 each. Write NOW for proposition.

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## TAKE THE END-PLAY OUT!

—WITHOUT PULLING THE MOTOR



THE C. A. ADJUSTABLE CENTER BEARING CAP corrects Ford crankshaft end play and sets magnetos for highest efficiency without removing the motor. Easily and quickly installed. Guaranteed for one year. List price \$3.75. Ask your jobber or dealer or write us direct.

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Spring-steel, Oil-tempered Bumpers in Six Complete Styles. Guaranteed Satisfactory Attaching Arms for all Leading Makes of Cars.

We invite comparison in appearance, quality and price.

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AN AUTOMOTIVE  
NECESSITY THAT SELLS

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Valves Exclusively for over 9 years



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WAYNE TOOL MFG. CO., WAYNESBORO, PA.

Be equipped with these two efficient machines to render good service on cylinder reboring and valve grinding jobs. Save time and labor and get more profit.

Write for details.

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FOR FORD CARS

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The C & G Wheel Puller removes wheels in a jiffy. No thread stripping. No wobbly wheels from spoke strain or sprung brake drums. The harder the pull, the tighter the grip evenly applied over whole wheel hub. Write for further information.

Sold on money back guarantee—\$12.00

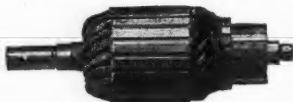
Adapters—\$2.00 each

State for which car. Adapters fit from two to 15 cars.

The C & G Wheel Puller Co., Wellsville, N. Y.

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FORD  
ARMATURES  
REWOUND  
\$2.00



MOST ANY  
TWO UNIT  
GENERATOR  
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ALL WORK GUARANTEED—WRITE FOR PRICE LIST  
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Handles all cars for all kinds of work. Great for spring and chassis repairs. Saves time—makes money for you. Priced RIGHT. Write for catalog.

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For the Complete Manufacture of  
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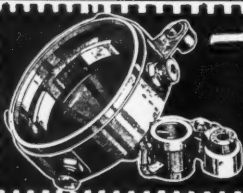
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We make the best radiator test plug.

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Toledo, Ohio



### —Bakelite Case!

This famous roller-type timer is absolutely "short-proof". The only standard timer with Bakelite case.

MILWAUKEE  
TIMER for FORDS



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Over 700 Service Stations and 1400 Dealers

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## TIMKEN

Tapered  
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Cylinder Re-Conditioning Tool

Regrinds and refinishes cylinder bores. It is self-adjusting, self-aligning and self-centering. Write for Bulletin.

Automotive Maintenance Machinery  
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### YOU can handle this body PROFITABLY

**HYMAN  
PRESSED  
BODIES**

THE HYMAN PRESSED BODY CO.,

All steel construction provides lightweight with extreme strength. Outlast chassis. One design fills most light truck user's requirements. Ton and Half-ton sizes. Shipped knocked down. Low priced. Distributor and dealer terms liberal. Write.

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The new Columbia selling agreement incorporates those features interesting to successful dealers. You are invited to investigate.

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"The Best-Equipped Shop  
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## FEDERAL BUMPERS



Beauty and ruggedness combined—made in two styles: —the Metropolitan with one piece pressed steel front; and the Broadway double spring bar model.

Catalog No. 11 mailed on request

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Jobbing Division:—London Guarantee & Accident Bldg., Chicago

Stevens

SPEED  
UP



Tools

Ask for  
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OVER 100 ACCURATE SHORT-CUTS  
TO GOOD WILL AND PROFIT ~ ~  
"Thru your jobber—his service is economy"

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The name "RED GIANT" is a guarantee of satisfaction. Known and used in the majority of the civilized world. If your jobber cannot supply you write direct.

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Let us send you our FREE Catalogue on

## Huetter's Fly-Wheel Gear Bands

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No tools required. One turn of wheel under weight of car closes and locks link. Repairs instantly. Price, 10 links in box, 25c.

Write for prices, samples and discounts.

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Rochester, N. Y.

"It pays to buy a Kellogg"

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ROCHESTER, NEW YORK



## Real High Tension Ignition for Ford Cars

Varley Transformers eliminate nearly all chronic ignition trouble. Save gas. Add power. Keep plugs clean. Stop misfiring. Save repairs. \$2.50 each. Write for full particulars.

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\$5

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Water Circulating Pump  
For Ford Cars and Trucks

Is as reliable as the Ford Car itself and assures a positive cooling system that constantly functions. No more overheating—No more freezing in travel—Made engineeringly correct of best materials—quickly and easily installed. Write for Dealer Discounts and complete information.  
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**UNITRON  
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New and Wilsey Streets NEWARK, N. J.

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## The Book "AIR PROFITS"

Shows how to get more work out of an air compressor. How to use compressed air for many pay jobs.

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Adjustable. Two sizes will clamp any hose of any diameter. Made from cold rolled steel out of wire. No rough edges to cut hose. Put on in less than a minute. Everlastingly leak-proof. Order Universal Hose Clamps. Trademark on every clamp and carton. Get them from your jobber—or write us.

**UNIVERSAL INDUSTRIAL CORP.**

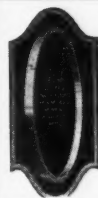
Hackensack, N. J.

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Metal-Melting Soldering Heat-Treating

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Pacific Coast Repr., C. B. Babcock Co., San Francisco, Calif.  
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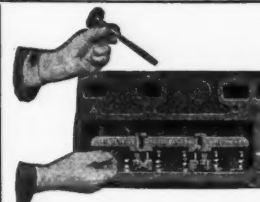
**American  
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Piston Rings**

**American Hammered Piston Ring Company**  
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Instantly adjusted to any desired shading position with one hand from driver's seat. Makes night driving safe. One size for all cars. Write at once for our plan of distribution and full details.

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## SPEED-O Multiple Valve Lifter

LIFTS 8 TO 12 VALVE SPRINGS  
IN LESS THAN 30 SECONDS

Manufactured by  
**SPEED-O MULTIPLE VALVE LIFTER CORP.**  
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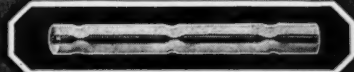


**CRANK PIN  
RE-TURNING  
TOOL**



**The Auto Hone Co., Buffalo, N. Y.**

"REQUIRES  
ONLY  
HEAT"



SAMPLE  
FREE

**KESTER Acid-Core WIRE SOLDER**  
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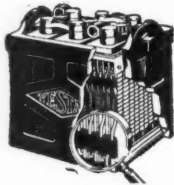
**Buick Continues Hall Endorsement**

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Isolators  
Lock  
Plates.  
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**As Old As  
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Vesta has 27 years of experience built into it. The Isolators have been used for 8 years. Always in keeping with automotive requirements. Write for our proposition.

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**NEVER-LEAK****CYLINDER HEAD GASKETS**

Heat-proof Gas-proof Can't blow out Retain their life  
Oil-proof Water-proof Last longer Keep customers sold

One for every standard make of car, truck and tractor.  
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**Do Motor Re-conditioning  
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You can ream and hone an average cylinder bloc the factory way in fifty minutes. Do the work without removing the engine, quickly, efficiently and economically.

**All you need is**

**FOSTER-JOHNSON**

Cylinder Reamers and Hones

Write for Foster-Johnson Station  
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*Yes!*

**Outperforms any  
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BUILT BY THE GARDNER MOTOR CO.—BUILDERS OF VEHICLES SINCE 1882

**Noiseless Timing Gears**

Install quietness — Cloyes NOISELESS Timing Gears. They give the motor a soft, even "purr"—permanently.

Cloyes Gear Works  
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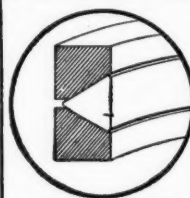
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**FRONTENAC CYLINDER HEADS  
and FRONTY-FORDS**



The remarkable showing of the Fronty-Ford in the 500-Mile Race at Indianapolis May 30 was due solely to the performance of the Frontenac Cylinder Head. This Head is adapted for use on your Ford car by its designer and builder, Arthur Chevrolet. Write for FREE Catalog. Book, "How to Build a Fronty-Ford," \$2.00; free with orders of \$50.00 or more.

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Wedge-Rite piston rings are 3-piece rings following the best engineering practice. The patented wedge takes up the wear, keeping the groove and cylinder wall tight against oil and compression leakage. Wedge-Rite Piston Rings are made from the best individual castings.

WedgeRite - - - Plattsburgh, N. Y.

**\$2.00**

Retail  
East of  
Rockies

**Life Timer  
for Fords**

Needs no oil. Short proof. Fool proof. Wipes a perfect contact regardless of wobble in the shaft. Bakelite Commutator is reversible, giving 2 timers for the price of one. Sold through the jobber. Write for folder and discounts.

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**DISTRICT REPRESENTATIVES**

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If you know how to select and develop successful dealers this advertisement presents an exceptional opportunity. Your application will be held in strict confidence by the sales manager. Interviews for those who present proper qualification in first letter. Address Box 6145 care of Motor Age, 5 So. Wabash Ave., Chicago, Ill.

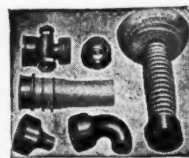
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Dims the lights with a touch of the toe. A remarkable seller. \$1.50. For all cars.

Distributors Wanted

**THE DIMIT CO.**

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Water Saver**

Illustrating Our No. 2 With Attachments  
A complete washing service, listed valuation \$6.25. Specially priced \$5.00 for the complete set, less dealer's discount.

Eliminates water waste and increases washing efficiency.

Write for further details.  
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Special Combination  
PRICE \$5.00 LIST

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Honeycomb and tubular replacement cores, Radiators and parts for all cars and trucks.

One-day service. Dealers find our agency profitable.

Write for our plan

**Rome-Turney Radiator Co.**

Service Dept., - - - Rome, N.Y.

**Biflex** Cushion  
Bumper  
for every car



"PROTECTION  
WITH DISTINCTION"  
**THE BIFLEX CORPORATION, Waukegan, Ill.**



**"In Stock -  
Not Over a Day Away"**

Write Milwaukee Die Casting Co., Milwaukee, Wis., for name of one of our 500 distributors nearest you.

**MILWAUKEE BEARINGS**



*Thirty-seven*  
**BRANCHES**

**AHLBERG BEARING COMPANY**  
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A Department that will Find What You Want

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#### Save Time and Money

We carry a complete line of Automobile Parts  
**Transmissions (all kinds)**  
**Cylinder Blocks**      **Magnetos (all kinds)**  
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**New Gears (all kinds)**      **Starters**  
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 400 Motors of all kinds in stock at all times

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### BENNETT BROS.

Largest Auto Wreckers in the Country  
 Grant and Water Sts.      Pittsburgh, Pa.  
 Mail Orders Given Prompt Attention

### DOWMETAL PISTONS

Lighter, stronger, and longer wearing than aluminum or iron. Can be fitted with bronze bushings in the wrist pin holes same as in iron pistons. Dowmetal has no permanent growth. The expansion is little more than iron.

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We have wrecked over a  
 thousand cars.

SANDER BROS. AUTO WRECKING CO.  
 WEST POINT, IOWA

### WICHITA AUTO WRECKING CO.

"The Old Reliable"

Offers you quick service, quality parts and absolute satisfaction—and our prices are a little lower. We are an old reliable house and all that implies. Our stock of parts is one of the largest in the country—from a 1907 one cyl. Reo to a 1921 Overland Four.

Wichita GIVE US YOUR NEXT ORDER      Kansas

### AUTO PARTS

SAVE 50% TO 75% ON ALL CARS

New and Used Gears—Springs and Axles—Cylinders—Motors—Bear Systems, etc. Wire or Write  
 INDIANA AUTO PARTS CO.  
 316-18 NO. ILLINOIS ST., INDIANAPOLIS, IND.  
 LARGEST CAR WRECKERS IN INDIANA

### JANSEN FLY WHEEL GEAR RINGS

Chevrolet 490.....\$3.00  
 Chalmers ..... 4.00

JANSEN MACHINE COMPANY  
 Des Moines, Iowa

### AUTO Save 50 — 80% 2000 Models PARTS

NEW AND USED GEARS, AXLES, BEARINGS, SPRINGS, MAGNETOS, GENERATORS, ETC. JOBBERS IN BANKRUPT AUTO SUPPLIES.

### BRIGHTMAN AUTO EXCHANGE

331 Windsor Ave.      HARTFORD, CONN.

## INFORMATION

**Six cents a word** is the rate for all undisplaced advertisements set solid, regular want ad style; all capitals, 9c. a word; all capitals leaded, 12c. a word; minimum charge \$1 an insertion; payable in advance (see next paragraph).

**Ten per cent discount** if one payment is made in advance for four or more consecutive insertions. Advertisements other than "Positions Wanted" will be billed monthly if run more than four times.

**Add five words** for address if replies are to come to a box number address at any of our offices. These replies are forwarded each day as received, in new envelopes, at no extra charge.

**Refund will be made** if all insertions ordered are not needed, the amount refunded being the difference between cost of insertions given and full amount paid.

**Telephone orders** must be confirmed in writing same day. No allowances can be made for errors of any kind unless prompt notification is sent us.

**When replying** to blind ads be careful to put on your envelope the correct box number and do not enclose original letters of recommendation—send copies.

**Displayed advertisements** are sold by the inch. Rates will be furnished upon application.

**The right is reserved** to refuse any advertisement and also to rewrite and edit copy furnished whenever the publishers consider it advisable to do this.

## THE BROADCASTER DEPARTMENT

### THE CLASS JOURNAL COMPANY

239 W. 39th St., New York  
 5 S. Wabash Ave., Chicago

## PARTS and REPAIRS

**ANY PART**      **Send for Catalogue**  
**for**      **Cincinnati Auto Parts**  
**ANY CAR**      **& Wrecking Co.**  
**NEW**      **712-714 Walnut St.**  
**or**      **CINCINNATI, OHIO**  
**USED**      **Parts our middle name**

Garage and repair men. Why pay factory price for replacement parts when we can give you 20-60% discount on standard parts? Write for latest parts list. Economy Car Parts Co., 331-337 Main St., Bowling Green, Ky.

Valves, pins, bolts, bushings, shafts, rings, bearings, gaskets, belts, springs, all motors and cars. No second-hand parts. All new, standard make. Evans-Lawrie Company, 782 Commonwealth Ave., Boston, Mass.

### SPECIAL RACING PARTS

Special camshafts and special counterbalanced crankshafts for racing cars. Write for price list of other special parts. J. E. Gallivan, Rantoul, Illinois.

### PARTS FOR AUTOS AND TRUCKS

WHAT DO YOU NEED? We have it. Gray's Auto Parts Company, 3212 Brighton Road, Pittsburgh, Pa.

### PATENTS and PATENT ATTORNEYS

## PATENTS

BOOKLET FREE      HIGHEST REFERENCES  
 PROMPTNESS ASSURED      BEST RESULTS  
 Send drawing or model for examination  
 and report as to patentability  
**WATSON E. COLEMAN, Patent Lawyer**  
 644 G Street, N. W., Washington, D. C.

Attorney-at-Law and Solicitor of Patents  
**C. L. PARKER**

Formerly Member Examining Corps., United States Patent Office

American and foreign Patents secured. Searches made to determine patentability and validity. Patent suits conducted. Pamphlet of instruction sent upon request.  
 McGill Building, WASHINGTON, D. C.

## MISCELLANEOUS

### FOR SALE

**SPECIALTY AUTO JACK** for Ford and light cars, with many unique and attractive selling features, including patents, tools, dies and equipment complete for manufacture. Good business and distributing connections already established. Would make a splendid addition to accessory line already on sustaining basis. For full particulars, address MANUFACTURER, Box 6146, c/o MOTOR AGE, 5 So. Wabash Av., Chicago, Ill.

### IMPROVE

Your business standing and prestige  
 by using Quality

### LITHOGRAPHED STATIONERY

Our special combination plan of operation makes it possible for us to furnish you fine Lithographed Stationery produced on a White 30 lb. Watermarked Bond in quantities as low as 2000 and up.

### AT LESS THAN PRINTING PRICES

### ENGRAVED HEADING FREE

Made up in anyone of the many beautiful and original designs we feature. You must see our samples to appreciate what we are offering you.

**Send for Samples and Full List of Prices**  
 Just a few of our prices on 8 1/2 x 11 letterheads or 6 1/2 envelopes for comparison.

4M	12M	50M	100M
\$5.95	\$3.50	\$2.25	\$2.10
per M	per M	per M	per M

Your Repeat Order Will Cost You Less  
**PEERLESS LITHOGRAPHING CO.**  
 1821-23 Berneau Ave.      Chicago, Ill.

### Landis Crankshaft Grinder

Fully equipped for regrounding crankshafts. Excellent con. A money maker for a repair shop. Also No. 60 Heald Cylinder Grinder Bargains.

### ENGINE REBUILDING CO.

1881 E. 119th St., Cleveland, O.

**SIMPLIFY THE WORK** in your Auto Repair Shop by sending for our free booklets: "Hadco Safeguard System for Double Checking the Time, Material and Tool Losses" and "How to Lay Out the Auto Stock Room" and free samples of repair orders, job tickets, time sheets, parts sales slips, auto bin markers, card holders and auto stock boxes. Haddon Bin Label Co., Haddon Heights, N. J.

**FOR SALE**—Fully equipped Automotive Electric Station with ten Nationally known Electrical equipment lines, battery, etc., and jobbing discounts in Texas city of 20,000 with oil well and natural gas production activity. Health. Address: Box 6142, care Motor Age, 5 So. Wabash Ave., Chicago.

**ONE HAYWOOD STEAM VULCANIZER** and tools. Plant complete in every detail. Gasoline burner for heating. Plant in A-1 condition. Used only one year. Will sell cheap if sold soon. Write or call R. E. Baker, Dundee, Ohio.

**No. 60 HEALD CYLINDER GRINDERS** at a bargain. Rebuilt and fully 90% new. You can save their cost in a short time. Write for photo and full particulars. Lucas & Son, Inc., Bridgeport, Conn.

**GARAGE SACRIFICE**—Fully equipped new building. Storage for 40 cars. Profitable agencies and repair shop. Ideal location. Will sell stock below cost. Brinton's Garage, Salisbury, Conn.

**BATTERY CARRIER**—Most simple, efficient made. Two by parcel post, \$1.15. Horace D. Shields, R. R. No. 3, Grand Rapids, Michigan.

### HELP WANTED

**A LIVE WIRE SALESMAN** with mechanical ability to handle a well advertised line of automobile service station equipment to be sold through the jobbing trade. Liberal commission, exclusive territory. No objection to non-competing lines. State experience. Address Box 6144, care of Motor Age, 5 S. Wabash Ave., Chicago, Ill.

**"NORMA"**  
BALL BEARINGS



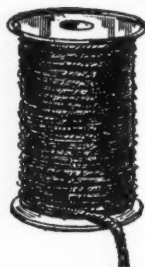
**PRECISION BEARINGS**

**HOFFMANN**  
ROLLER BEARINGS

THE NORMA COMPANY OF AMERICA  
ANABLE AVE., LONG ISLAND CITY, N.Y.

# PERFECTION

"A Trouble Proof  
Job That Stays Put"



# PUMP PACKING

You can't buy anywhere a more serviceable general utility replacement packing for automotive pumps than "Perfection."

It is a twisted, long fibre, heavily graphited packing that lubricates itself.

No clogging and minimum wear on rods.

Sold in usual size by leading jobbers—or write us, sending order.

**Advance Packing & Supply Co.**  
808 Washington Blvd., Chicago

Pac. Coast Distributor: Allied Industries Inc., San Francisco, Los Angeles, Seattle

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## Simplicity

Portable Cylinder Reborer and Grinder

You too can have this Profit Maker

Dashiell Motor Co. Dodge Brothers Dealers. Chicago, Ill., write: "Photograph shows Simplicity boring and grinding tool set on one of the new Dodge Cars. Of course this car has not come to regrinding yet, but we wished to know if it would fit the new model as well as type '23."

"We are now boring and grinding in the frame all of our cars and we only remove the motor when it is necessary to scrape in bearing. We can save our customers about \$24 by this method."

"Your machine is giving us exceptional satisfaction and has never needed any repairs."

Dashiell Motor Co.  
F. M. Paul, Superintendent.

You can Buy a Simplicity on Easy Terms. Write today for prices and terms.

Hundreds in use. Pat. March 16, 1915, May 11, 1920. Other Patents Pending.

Satisfaction Guaranteed

SIMPLICITY MFG. CO., Dept. C, Port Washington, Wis.  
Export Office: 549 W. Washington, Chicago, Ill.  
State Agents Wanted for Open Territory.

## Start Your Season Right—and Early



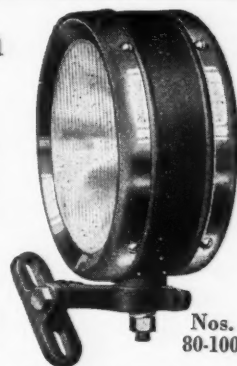
Auto Lamps serve a particular purpose—to satisfy the user with profit to the seller.

You, as a seller, can carry K-D Auto Lamps with a world of confidence. They sell quickly, stay sold surely and bring you satisfactory profit.

Order the three numbers illustrated here for your warm-weather business.

## The K-D Lamp Co.

CINCINNATI, OHIO

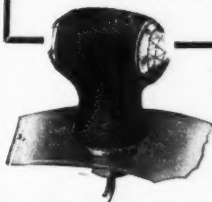


Drum Shape Head Lamps

With Universal Bracket. Two sizes, 9 in. and 10 in. front diameter. Body is drawn in one piece. All plated parts are brass, highly polished and absolutely rust-proof.

Reflector is parabola shaped brass, highly polished and plated. Single or double circuit.

Finished all nickel or black enamel, baked on, with nickel trimmings. Both models are supplied with an approved dimmer lens.



No. 28 Parking Lamp

Small type Parking lamp, body made from solid casting, top easily removed for replacement of bulbs. To install; drill one hole in fender, fastened underneath with lock washer and nut.

Glasses are cut jewel type, ruby in rear, crystal in front. Lamp does not have self-contained switch, necessary therefore to install separate switch on instrument board.

Bulbs are 21 c.p., 6-8 volt, single wire circuit only. Each lamp is furnished with nut and lock washer for attaching.



Three Way Parking Lamp (Same construction as No. 28, with Extra Green Lens.)

# Note the~ Sidewall Bumpers



Sidewall Bumpers! A new and better principle for the prevention of curb and rut chafing. These rugged, rubber bumpers on the exposed portion of the sidewall provide positive protection against lateral shocks.

And the handsome, black Kokomo Balloon Cord has been scientifically designed throughout to meet balloon tire conditions.

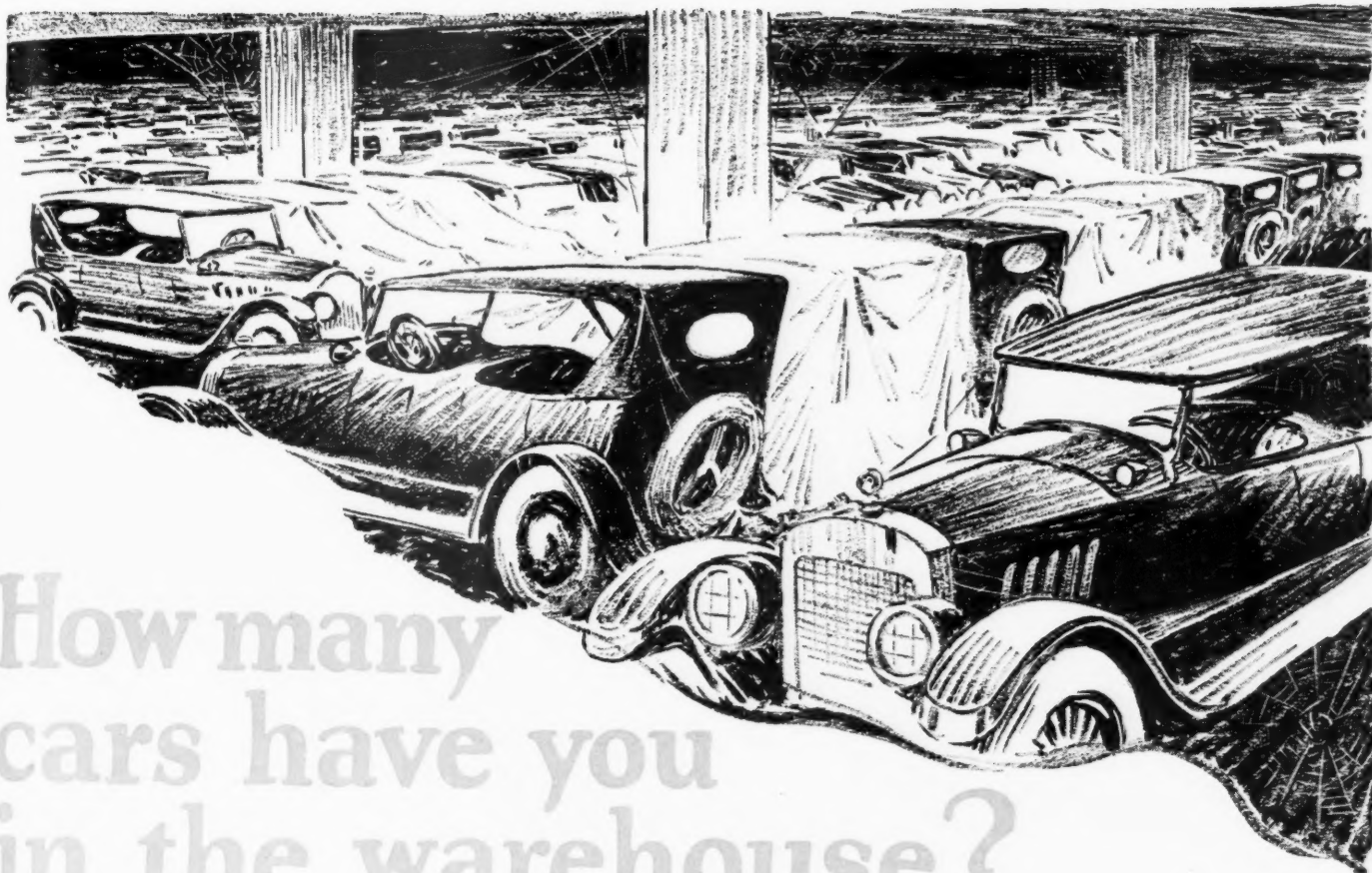
With Kokomo Balloons (for special wheels or existing rims) you can dominate this fast growing market in your territory.

Write today. Let us tell you about their many points of practical superiority.

KOKOMO RUBBER CO., KOKOMO, INDIANA

LONG~LIFE  
**Kokomo**  
**Balloons**





How many  
cars have you  
in the warehouse?

Stutz distributors and dealers never are required to accept automobiles in excess of the number they actually want.

Stutz distributors and dealers never find that what they had counted on as *profit* is being dissipated in costly carrying charges and warehouse fees.

Stutz distributors and dealers are not numbered among those motor car merchants who fail because of "customs of the industry."

The Stutz franchise is based on co-operation with the dealer. It is founded on fairness in all things—on common, simple honesty—and the realization that the Stutz Motor Car Company of America, Inc., will prosper in the exact degree to which Stutz dealers prosper.

Perhaps you might find it to your profit to know more about the Stutz franchise now.



*A Complete Line of Enclosed and Open Models*

Price range \$1995 to \$3785 f. o. b. factory

# STUTZ SIXES

STUTZ MOTOR CAR COMPANY of AMERICA, Inc., Indianapolis, Indiana  
*Builders of the Original and Genuine Stutz Motor Cars*

# Gill-Improved Engines

*Something Big to Sell*

Now, when an overhaul comes in, do an all-Gill job.

Now, when an overhaul goes out to your customers, let Gill Quality assume full responsibility throughout—in the rings *and* in the pistons *and* in the pins.

Step out of the common class, just “putting in” replacement parts. Turn out every engine *Gill-Improved*.



A big idea for you. Bigger rewards.

Watch coming Gill advertisements about *Gill-Improved* Engines.

GILL MANUFACTURING CO., CHICAGO

**RINGS PINS PISTONS**